C21.5: 953/3

Vol. 953 Number 3

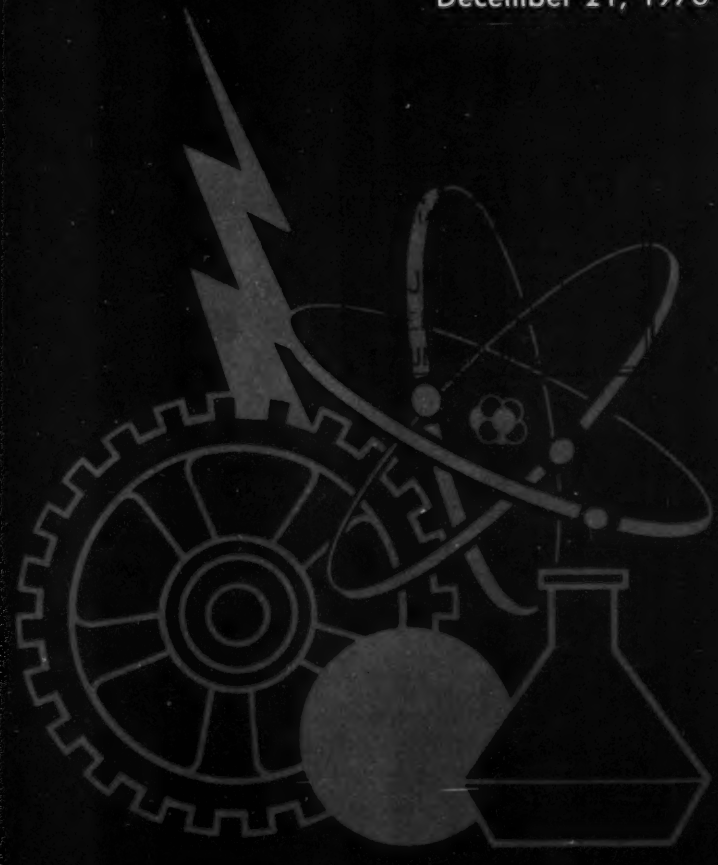
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

December 21, 1976



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December 21, 1976 Volume 953 Number 3

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Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before January 26, 1977.

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Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,904,709, M. E. Lautner, ELECTRIC MOTORS, **filed** June 2, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c1776, *MSL Industries, Inc.* v. *Airtrol Corp. and Barber-Colman Company*. Cause dismissed with prejudice, July 19, 1976.

2,908,831, G. Hirsch, SPIT DRIVE UNITS, **filed** June 2, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2042, *McGraw-Edison Company* v. *Beatrice Foods Co.*

2,936,008, D. E. Brown, MOBILE WHOLE-TREE WOOD-CHIPPER UNIT; **3,661,333**, L. N. Smith, TREE DESTROYER, **filed** July 13, 1976, D.C., N.D. Ala. (Birmingham), Doc. 72–G–282–S, *Precision Chipper Corporation* v. *Norbark Industries, Incorporated*. Consent order and decree, claims of 3,661,333 and claim 1 of 2,936,008 are valid and infringed. Defendants are enjoined from further infringing or contributorily infringing said patents. July 13, 1976.

3,022,012, Sharp and Streeter, PARTIAL CIRCLE WATER SPRINKLERS, **filed** Jan. 20, 1976, D.C., E.D. Calif. (Fresno) Doc. F–76–16, *Rain Bird Sprinkler Mfg. Corp.* v. *Royal Coach Sprinklers, Inc.* Case was dismissed by stipulation under Rule 41 of the F.R.C.P., Aug. 3, 1976.

3,036,836, H. D. Moed, ARALKYLAMINES AND METHODS OF PREPARATION THEREOF, **filed** July 27, 1976, D.C. Ariz. (Phoenix) Doc. C–76–513 Phx, *Mead Johnson & Company and U.S. Philips Corporation* v. *Apothecs, Inc.* **Same, filed** Aug. 2, 1976, D.C., S.D.N.Y., Doc. 76–C–3324, *Mead Johnson & Company et ano.* v. *American Roland Corporation.*

3,112,586, A. E. Luetzow, METHOD AND APPARATUS FOR FORMING A COVERING ABOUT A GARMENT, **filed** July 1, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76–469, *Albert E. Luetzow* v. *BMT Manufacturing Corporation and Jockey International, Inc.*

3,246,336, Baribo, Porter, Turner and Wright, MOLASSES FEED BLOCKS AND METHOD OF PREPARATION AND USE, **filed** June 20, 1972, D.C., S.D. Iowa (Des Moines) Doc. 728123, *A. E. Staley Manufacturing Co.* v. *Vylactos Laboratories, Inc.* Ordered and adjudged that A. E. Staley Mfg. Co. is owner of entire right, title and interest of said patent, June 7, 1976.

3,293,272, E. H. Freund, MANUFACTURE OF SUCCINYL MONO-GLYCERIDE; **3,370,958**, E. H. Freund, COMPOSITIONS COMPRISING SUCCINYL HALF ESTERS, **filed** June 28, 1976, D.C., M.D. Fla. (Orlando) Doc. 76–259–Orl–C–Y, *Eastman Kodak Company* v. *Southern Shortening Incorporated.*

3,294,431, Gregory and Berry, KNOTTER LOCK FOR TYING MACHINE, **filed** June 29, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2394, *B. H. Bunn Company* v. *Consolidated International Corporation.*

3,360,827, E. O. Aichele, PLASTIC DISPENSING MEANS, **filed** July 7, 1976, D.C. Ind. (Indianapolis) Doc. IP 76–379–C, *Zapata Industries, Inc., Richard O. Aichele and Eugene E. Aichele* v. *H-C Industries, Inc.*

3,370,958. (See 3,293,272.)

3,398,689, R. W. Allington, APPARATUS PROVIDING A CONSTANT-RATE TWO-COMPONENT FLOW STREAM, **filed** July 23, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c2079, *Instrumentation Specialties Company* v. *Varian Associates.* Enter judgment in favor of the plaintiff and against the defendant. The counterclaim of the defendant and counts 2 and 3 of the complaint are dismissed with prejudice, July 9, 1976.

3,421,290, Cheney and Rorie, INDOOR SMOKE REMOVAL SYSTEM, **filed** July 28, 1969, D.C., S.D. Ohio (Cincinnati) Doc. 7177, *Enviro Air, Inc.* v. *United Air Specialists, Inc.* Final judgment, plaintiff's motion to amend said findings and conclusions has been denied. Said patent is invalid. All other claims of plaintiff and defendant are denied and dismissed, July 29, 1976.

3,462,964, R. K. Haroldson, AIR CONDITIONER CONTROL MEANS RESPONSIVE TO VEHICLE ENGINE POWER DEMANDS, **filed** July 16, 1976, D.C., M.D. Fla. (Orlando) Doc. 76–279–Orl–C–R, *Ralph K. Haroldson and Halem Industries, Inc.* v. *Louis Volkswagen, Inc., Jim Hooper Volks, Inc. and Volks of Amer.*

3,563,286, K. S. Strobel and P. E. Heiser, SAW, **filed** Jan. 20, 1976, D.C., N.D. Ga. (Atlanta) Doc. C76–114A, *Weyerhaeuser Company* v. *North American Products Corporation et al.* Consent judgment for permanent injunction that said patent issued to plaintiff is good and valid. Said defendants have infringed on said patent and hereby perpetually restrained and enjoined from infringing or violating the rights of plaintiff in said patent in any way whatsoever, July 14, 1976.

3,635,297, R. F. Salava, POSTAGE CALCULATOR, **filed** July 9, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2515, *Roger F. Salava et al.* v. *The Singer Company.*

3,661,333. (See 2,936,608.)

3,669,298, R. L. Silver and A. J. Schmidt, MATERIAL HANDLING BOX, **filed** June 29, 1976, D.C., N.D. Ohio (Toledo) Doc. C76–321, *Triple E Corporation* v. *Sanchez Enterprises, Inc.*

3,674,061, Calisher and Burbick, LIQUID TRANSFER APPARATUS WITH PRESSURE-SENSITIVE AUTOMATIC SHUTOFF NOZZLE, **filed** Feb. 26, 1976, D.C.N.J. (Trenton) Doc. C–76-351, *DeLaval Turbine, Inc.* v. *Aeroquip Corporation.* Stipulation of dismissal, July 7, 1976.

3,704,352, J. G. Fontaine, COMPOSITE SEAT AND SWITCH, **filed** Oct. 26, 1973, D.C., W.D. Wash. (Seattle) Doc. 644–73C2, *Safe Stop Brake Corporation* v. *General Motors Corporation.* Finding of fact and conclusions of law stating that said patent has not been infringed, June 18, 1976.

3,757,067, D. P. E. Barnard, HEATING ELEMENTS, **filed** Oct. 12, 1975, D.C.N.J. (Camden) Doc. 75–1826, *Interdynamics, Inc. and Smiths Industries, Ltd.* v. *Budge Mfg. Co., Inc.* Consent judgment for injunction, defendant has infringed said patent, and except as provided in the Memorandum of Agreement, said defendant is hereby enjoined from infringing upon any claim of said patent, June 25, 1976.

3,757,316, J. Fiorenzo, ALARM ASSEMBLY COMBINED WITH CLEANOUT PLUG STRUCTURE, **filed** July 16, 1976, D.C.N.J. (Newark) Doc. C–76–1378, *Joseph Fiorenzo* v. *Eico Electronic Instrument Co., Inc.*

3,785,569, R. Helmrich, AEROSOL GRENADE, **filed** Feb. 11, 1976, D.C.N.J. (Newark) Doc. 76–265, *Diamond Aerosol Corporation* v. *Security Laboratories, Inc. et al.* Judgment for permanent injunction in favor of the plaintiff, July 29, 1976.

3,818,464, F. J. Becker, WIRING GUIDE FOR COMPUTER CORE MEMORIES, **filed** July 21, 1976, D.C. Colo. (Denver), Doc. 76–F–722, *Duluth Scientific, Inc.* v. *Lectra Products Co., doing business as Colorado Circuits Corporation and Wayne G. Speth.*

3,820,100, Ballinger, Eggestad and Olmsted, PRESENCE DETECTOR HAVING AUTOMATIC DIGITAL TUNING, **filed** July 30, 1976, D.C., M.D. Fla. (Jacksonville), Doc. 76–548–C–J–S, *Harmon Industries, Inc.* v. *American Standard, Inc. and Westinghouse Air Brake Company.*

3,821,463, W. F. Bakker, ELECTROMAGNETIC SHIELDING MATERIAL, **filed** Nov. 14, 1975, D.C.N.J. (Newark) Doc. 75–1953, *Metex Corporation* v. *Radcon Corporation.* Order of dismissal of action, July 28, 1976.

3,826,987, J. D. Stevens, MINIATURE RADIO RECEIVER; **D. 232,767,** same, **filed** May 21, 1975, D.C.N.J. (Newark) Doc. 75–873, *A. K. Hoch Manufacturing Company* v. *Robbins Radio, Inc., also known as Robbins Novelty and Thomas Robbins.* Order of dismissal of action pursuant to General Rule 30, June 30, 1976.

3,831,983, C. F. Stickler, PLUMBING CONNECTION; **3,917,497,** same, METHOD AND APPARATUS FOR FORMING TWO INTERFITTING PREFORMED PARTS BY HEAT FUSION OF SAID PARTS, **filed** June 29, 1976, D.C., E.D. Mich. (Flint) Doc. 76–40070, *Qest Products Inc.* v. *Genova, Inc.*

3,842,802, Lang and Hight, MARKER FOR USE IN THE DETECTION OF OESTRUS IN ANIMALS, **filed** July 20, 1976, D.C., S.D. Fla. (Miami) Doc. 76–1197–C–NCR, *AG-Tronic, Inc. and John Cyril Malloy* v. *New Zealand Inventions.*

3,884,439, J. Jeninga, GOLF BAG CRADLE-BRACKET, **filed** Oct. 22, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–613, *Atlantic Products Corporation* v. *Ajay Enterprises, Inc.* Stipulation and order dismissing action without prejudice, July 7, 1976.

3,917,497. (See 3,831,983.)

3,928,933, T. Iwamoto, HOLDING TOY, **filed** July 13, 1976, D.C., N.D. Calif. (San Francisco), Doc. C–76–1452–RHS, *ITI Hawaii, Inc. and Takeji Iwamoto* v. *East West Trading Co.* Same, **filed** July 28, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–2413–RF, *ITI Hawaii, Inc. et al.* v. *Hatoh's Card Shop's Inc.*

3,940,026, C. L. Kain, CONTAINER FOR PRESSURE DISPENSING OF FLUID, **filed** July 29, 1976, D.C., N.D. Okla. (Tulsa) Doc. 76–C–407–C, *Calvin L. Kain* v. *Kain's Research and Development Company, Inc.*

3,943,661, De Vito and Tendrup, PLASTIC FLOWER BASKET, **filed** July 8, 1976, D.C.N.J. (Trenton) Doc. C–76–1330, *Plastiform Enterprises, Inc.* v. *Koba Corp.*

D. 232,767. (See 3,826,987.)

D. 237,758, E. L. Huffman, EYE SHADE WITH REMOVABLE CROWN, **filed** June 28, 1976, D.C., M.D. Fla. (Tampa) Doc. 76–512–C–T–K, *Erline L. Huffman* v. *Belleair International.*

2,970,730, F. W. Schwarz, DICING SEMICONDUCTOR WAFER; **3,442,725,** Huffman, Ehlenberger and McDonald, PHOSPHORUS DIFFUSION SYSTEM, **filed** Oct. 29, 1975, D.C., E.D. Pa. (Philadelphia) Doc. 75–3081, *Motorola, Inc.* v. *Mos Technology, Inc.* Consent judgment order, all claims of plaintiff and all claims, defenses and counterclaim of the defendant are hereby dismissed with prejudice, Mar. 18, 1976.

3,031,788, M. L. Shannon, FISHING TACKLE; **3,628,274,** C. P. Wojahn, TEMPERATURE-SENSING SYSTEM FOR PLACEMENT OF FISHING LURES, **filed** Apr. 21, 1976, D.C., W.D. Mich. (Grand Rapids) Doc. G76–204Ca6, *R.D.T., Inc., doing business as Rivier Marine & Tackle Co.* v. *Jack King, doing business as King Industries and Luhr Jensen & Sons.*

3,228,007, G. Dirks, MAGNETIC STORAGE DEVICE; **3,641,528,** same, SIGNAL STORING DEVICE WITH REMOVABLE SIGNAL STORING UNIT; **3,657,712,** same, STORING DEVICE FOR SIGNALS, **filed** Oct. 23, 1975, D.C., Court of Claims, Doc. 373–75, *Hald Brothers Associates Inc.* v. *The United States.* Same, **filed** June 4, 1976, D.C. Del. (Wilmington) Doc. 76–191, *Control Data, Digital Equipment and Honeywell Inc.* v. *Hale Brothers Associates, Inc.*

3,430,365, J. F. Dee, Jr., LOW CUT SPORTS SHOE, **filed** July 30, 1976, D.C. Colo. (Denver) Doc. 76–W–753, *John F. Dee, Jr.* v. *Sears, Roebuck & Company.*

3,442,725. (See 2,970,730.)

3,510,004, J. Hoeltzenbein, ARTIFICIAL KIDNEY; **Re. 27,510,** same, **filed** Mar. 20, 1973, D.C. Del. (Wilmington) Doc. 4609, *Baxter Laboratories, Inc.* v. *Vernitron Corporation.* Stipulation of dismissal dismissing complaint without prejudice, Mar. 25, 1976.

3,537,091, G. E. Schenkenberg, SEED MONITORING SYSTEM; **3,928,751,** G. H. Fathauer, SEED POPULATION MONITOR, **filed** June 21, 1976, D.C., E.D. Ill. (Danville) Doc. 76–2–091, *Dickey-John Corporation* v. *Arends & Sons, Inc.*

3,628,274. (See 3,031,788.)

3,670,611, D. J. Jarman, SHEAR DISCHARGE CONVEYING SYSTEM; **3,793,916,** same, FEEDBACK CONVEYOR SYSTEM, **filed** Feb. 6, 1975, D.C., S.D. Ohio (Cincinnati) Doc. C–1–75–37, *Continental M.D.M., Inc.* v. *Spaulding Inc. and Ronald Spaulding.* Final decree permanently enjoining and restraining defendants from using Feedback Conveyors that infringe any of the claims of the said patent. The counterclaim entered by the defendants is dismissed with prejudice, Apr. 27, 1976.

3,702,076, H. W. Georgi, ELECTRONIC THERMOMETER; **3,877,307,** same, **filed** Mar. 15, 1976, D.C., S.D. Calif. (San Diego) Doc. 75–0292–T, *Ivac Corporation* v. *Diatek, Inc.*

3,708,967, Geist and Ballas, ROTARY CUTTING ASSEMBLY; **3,826,068,** same; **3,859,776,** Blackstone, Maddox, Rowland and Tate, METHOD AND APPARATUS FOR RECOVERY INSULATION AND CONDUCTOR FROM SCRAP INSULATED WIRE, **filed** July 16, 1976, D.C., N.D. Tex. (Fort Worth) Doc. CA–4–76–201, *K & S Industries, Inc.* v. *Weed Eater, Inc.*

3,711,806, R. W. Flentge, POWER RACK; **Re. 28,499,** same, **filed** June 9, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2134, *A. F. Dormeyer Mfg. Co., Inc.* v. *Internatl Components Corp. and International Converter Corp.*

3,793,916. (See 3,670,611.)

3,806,068. (See 3,708,967.)

3,826,068, Ballas and Geist, ROTARY CUTTING ASSEMBLY; **3,859,776,** Blackstone, Maddox, Rowland and Tate, METHOD AND APPARATUS FOR RECOVERING INSULATION AND CONDUCTOR FROM SCRAP INSULATED WIRE, **filed** July 9, 1976, D.C., S.D. Tex. (Houston) Doc. CA 76–H–1159, *Weed Eater, Inc.* v. *K & S Mfg. Co. et al.*

3,834,358, Frendberg and Gorzegno, VAPOR GENERATOR; **3,927,646,** R. H. Dammar, COIL WINDING MACHINE WITH IMPROVED WIRE GRIPPING AND CUTTING MEANS, **filed** Mar. 12, 1976, D.C., S.D.N.Y., Doc. 76–C–1224, *Foster Wheeler Energy Corporation* v. *Babcock & Wilcock Company.*

3,855,633, J. G. Rhee, KARATE GLOVE; **3,903,546,** same, PROTECTIVE GLOVE FOR THE HAND, **filed** Oct. 24, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–619, *Jhoon Goo Rhee* v. *Judo-Karate, Inc. and Norman Miller.* Consent judgment enjoining defendants from use of patents, Dec. 23, 1975.

3,859,776. (See 3,708,967.)

3,877,307. (See 3,702,076.)

3,892,363, R. O. Hilger, ATTACHMENT FOR HYDROTHERAPY BATH, **filed** May 11, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1766, *Associated Mills, Inc.* v. *American Import Merchants et al.* Same, **filed** June 28, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–2054–F, *Associated Mills, Inc.* v. *The Akron.*

3,903,546. (See 3,855,633.)

3,927,646. (See 3,834,358.)

3,928,751. (See 3,537,091.)

3,957,557, R. Fraige, WATER MATTRESS AND METHOD OF MANUFACTURE, **filed** May 19, 1976, D.C., N.D. Calif. (San Francisco) Doc. 76–1016 SC, *Vinyl Products Mfg. and Richard Fraige* v. *Hodel & Company et al.*

3,958,690, R. L. Garcia, MINIATURE SWITCH ASSEMBLY, **filed** May 19, 1976, D.C.N.J. (Newark) Doc. 76–936, *Grayhill, Inc.* v. *AMF Inc.*

Re. 27,510. (See 3,510,004.)

Re. 27,510, J. Hoeltzenbein, ARTIFICIAL KIDNEY, **filed** May 7, 1973, D.C.N.J. (Newark) Doc. 616–73, *Vernitron Medical Products, Inc.* v. *Baxter Laboratories, Inc.* Stipulation and order of dismissal of action, Mar. 29, 1976.

Re. 28,499. (See 3,711,806.)

PATENT NOTICES

Errata

All reference to Patent No. 3,974,842 to Ingram S. Chodorow of New York for Disposable Flosser appearing in the OFFICIAL GAZETTE of August 17, 1976 should be deleted since no patent was granted.

All reference to Patent No. 3,989,159 to Wayne Robert Nixon, et al. of Illinois for Drawn and Ironed Steel Container With Inclusions and Spheroidal Carbides appearing in the OFFICIAL GAZETTE of November 2, 1976, should be deleted since no patent was granted.

Certificates of Correction for the Week of Dec. 21, 1976

D. 240,716	3,953,711	3,972,866	3,981,104
3,654,384	3,954,190	3,973,301	3,981,388
3,804,430	3,956,353	3,973,700	3,981,689
3,806,336	3,956,500	3,974,134	3,981,856
3,808,171	3,956,571	3,974,600	3,982,080
3,830,831	3,957,907	3,974,995	3,982,869
3,847,829	3,958,115	3,975,248	3,982,940
3,876,864	3,959,826	3,975,953	3,983,030
3,881,489	3,960,925	3,976,632	3,983,159
3,900,187	3,961,469	3,976,984	3,983,235
3,907,769	3,963,901	3,977,067	3,983,439
3,911,816	3,964,022	3,977,212	3,983,456
3,912,238	3,964,287	3,977,817	3,983,515
3,912,771	3,965,653	3,978,912	3,983,566
3,916,899	3,965,732	3,979,095	3,983,739
3,923,801	3,965,825	3,979,217	3,983,815
3,929,016	3,967,100	3,979,279	3,984,299
3,931,222	3,967,181	3,979,313	3,985,498
3,932,590	3,968,251	3,979,466	3,985,720
3,932,952	3,968,268	3,979,916	3,985,730
3,933,678	3,969,081	3,979,977	3,986,377
3,934,743	3,970,584	3,980,134	3,986,462
3,947,301	3,970,611	3,980,146	3,986,728
3,947,999	3,970,716	3,980,236	3,987,138
3,948,751	3,971,631	3,980,241	3,987,297
3,948,838	3,971,658	3,980,261	3,987,374
3,953,124	3,971,908	3,980,434	3,988,233
3,953,378	3,972,085	3,980,605	3,988,273
3,953,507	3,972,835	3,980,754	3,988,563

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF NOVEMBER 20, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-29-76
HIGH POLYMER CHEMISTRY PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-2-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-2-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-4-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	5-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-13-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-22-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking: Tools; Cutlery; Jacks.	5-3-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	12-22-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	4-27-76

Expiration of patents: The patents within the range of numbers indicated below expire during December 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,914,768 to 2,919,442 inclusive
Plant Patents..... Numbers 1,882 to 1,892, inclusive

REISSUE PATENTS

GRANTED DECEMBER 21, 1976

ERRATA

For CLASS	See PATENT NO.
307–141	29,086

REISSUE PATENTS

GRANTED DECEMBER 21, 1976

ERRATA

For
CLASS
307-141 ..... PATENT NO.
..... 29,394

REISSUES

DECEMBER 21, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

Re. 29,083

ATOMIZER WHEEL FOR THE ATOMIZATION OF SUSPENSIONS OF HARD-WEARING MATERIALS

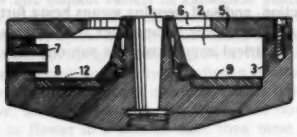
Kaj Nielsen, Bagsvaerd, Denmark, assignor to Aktieselskabet Niro Atomizer, Soborg, Denmark

Original No. 3,454,226, dated July 8, 1969, Ser. No. 536,326, Mar. 22, 1966. Application for reissue Aug. 21, 1973, Ser. No. 389,637

Claims priority, application Denmark, Mar. 26, 1965, 1602/65

Int. Cl.² B05B *3/10*; B04B *11/00*

U.S. Cl. 239—224 **11 Claims**



1. An atomizer wheel comprising a hub, an outer wall part coaxially disposed about said hub and a bottom part connecting said outer wall part with said hub, said outer wall part, said hub, and said bottom part defining between them an annular chamber, a ring-shaped cover member detachably connected to said outer wall part, said cover member having an inner circumference defining together with said hub an unobstructed space in communication with said annular chamber, said outer wall part being provided with a plurality of regularly shaped holes uniformly distributed around the circumference of the outer wall part, said holes forming the only outlet openings of the wheel, each of said holes being lined with bushing of wear-resistant sintered material, said holes and said bushings being tapered in direction radially outwardly from said chamber, the inner end of each of said bushings projecting into said chamber while their outer ends are substantially flush with the outside of said outer wall part.

Re. 29,084

SEPARATE RECYCLE OF REGENERATED ACID AND OF ISOPARAFFIN FROM HF CATALYST REGENERATION ZONE

Robert F. Anderson, La Grange Park, and Bipin V. Vora, Wheeling, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Original No. 3,879,488, dated Apr. 22, 1975, Ser. No. 461,761, Apr. 17, 1974. Application for reissue Jan. 30, 1976, Ser. No. 653,683

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.41 **2 Claims**

3. An alkylation process comprising:

(a) contacting a feed comprising an olefin and an isoparaffin with hydrogen fluoride alkylation catalyst at alkylation reaction conditions in a reaction zone;

(b) separating a reaction zone effluent into a hydrocarbon phase and a catalyst phase;

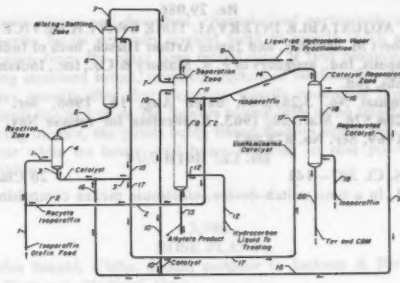
(c) returning a first portion of said catalyst phase to said reaction zone;

(d) passing a second portion of said catalyst phase to a catalyst regeneration zone to remove tar and constant boiling mixture of water and hydrogen fluoride from said [acid] *catalyst phase;*

(e) passing said hydrocarbon phase to a separation zone to separate unreacted isoparaffin and to withdraw an alkylate product;

(f) mixing said unreacted isoparaffin from step (e) with said feed prior to introducing said feed into said reaction zone;

(g) separating regenerated acid catalyst from said catalyst regeneration zone and recycling said regenerated acid catalyst to said reaction zone [in] *of* step (a); and,



(h) separating isoparaffin *substantially free of hydrogen fluoride* from *said* catalyst regeneration zone and mixing said separated isoparaffin with said feed [in step (a).] *prior to introducing said feed into said reaction zone.*

Re. 29,085

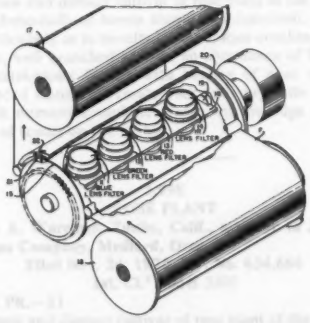
SPECTRAL-ZONAL COLOR RECONNAISSANCE SYSTEM

Edward F. Yost, Jr., Northport, N.Y., assignor to Spectral Data Corporation, Hauppauge, N.Y.

Original No. 3,715,962, dated Feb. 13, 1973, Ser. No. 30,199, Apr. 20, 1970. Continuation of Ser. No. 519,854, Jan. 11, 1966, abandoned. Application for reissue Oct. 29, 1974, Ser. No. 518,393

Int. Cl.² G03B *39/00*, *21/00*

U.S. Cl. 354—68 **10 Claims**



1. A method of remote sensing comprising the steps of

forming a plurality of photographic images of a common scene overflown by an airplane or satellite or the like by exposure of different film portions respectively primarily to different zones of the actinic electromagnetic spectrum;

developing said images;

illuminating the several developed film images individually with lights of selected chromaticities, the chromaticity of

the light illuminating at least one of said developed images being substantially different from the chromaticity associated with the corresponding exposing spectral zone for that image;

simultaneously displaying the illuminated developed images in registration for evaluation; and

individually varying the brightness of the contributions of the several developed images to the display resulting in contrasts, (of differences), from which information about the scene may be easily discerned.

Re. 29,086

ADJUSTABLE INTERVAL TIME SWITCH DEVICE

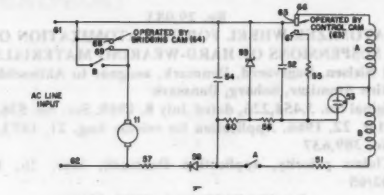
Robert M. Murphy, and James Arthur Hirsch, both of Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Original No. 3,267,304, dated Aug. 16, 1966, Ser. No. 266,576, Mar. 20, 1963. Application for reissue Nov. 21, 1969, Ser. No. 878,867

Int. Cl.[2] H01H 7/14

U.S. Cl. 307—141 28 Claims

1. In a time switch device, electronic means comprising a power supply circuit, a timer circuit, and an output relay circuit, said timer circuit cooperating with said power supply circuit to produce an electrical impulse of predetermined periodicity, said output relay circuit being adapted to dispatch



said electrical impulse to initiate operation of a stepping means, said stepping means being adapted to control a timed load function, and said stepping means being further adapted to reset said electronic means after each interval of time so that said electrical impulse may be automatically repeated.

PLANT PATENTS

GRANTED DECEMBER 21, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,992
KALANCHOE PLANT

Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015

Filed Sept. 2, 1975, Ser. No. 609,781
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a short, compact and bushy, but upright, habit of growth; flexible foliage of medium size which is topped by a profusion of small reddish colored flowers that are borne on short, stocky flower stems; a distinctive, unusual and attractive Brick Red flower color; the ability to flower in a shorter time than most other kalanchoe varieties; a distinctive and pleasant lemony flower scent; and excellent suitability for potted plant use.

3,993
PINK SACHET-PINK FLOWERING DOGWOOD TREE

Clarence M. Steppe, 3800 New Bern Ave., Raleigh, N.C. 27610

Filed Sept. 22, 1975, Ser. No. 615,502
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—51 1 Claim

1. A new and distinct variety of pink flowering dogwood tree, botanically known as *Cornus florida rubra*, substantially as illustrated and described, which most nearly resembles the Cherokee Chief variety, but being uniquely distinguished therefrom by the pronounced fragrance of its flowers generally resembling the composite fragrance of gardenia, honeysuckle and calycanthus.

3,994
ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 16, 1975, Ser. No. 622,905
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—28 1 Claim

1. A new and distinct cultivar of rose plant, substantially as herein shown and as described, characterized particularly as to novelty by its similarity to the parent cultivar, Marlena, U.S. Plant Pat. No. 2,700, but differing from Marlena in that in the subject cultivar the receptacle is quite glandular having a funnel-like shape with a broad distal end, the anthers being of a darker yellow, the filaments being shorter, the stigmas being of Uranium Green (6 3/2) W and protruding further than the anthers.

3,995
ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 16, 1975, Ser. No. 622,845
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—22 1 Claim

1. A new and distinct cultivar of rose plant, substantially as herein shown and described, characterized particularly as to novelty by its generally upright habit of growth, each main branch from the plant base terminating at first blooming in long stemmed broad, rounded clusters of blooms, the secondary growth after first blooming usually producing flowers borne one to a stem, the flowers having little or no fragrance, being bicolor, the petals being Blood Red on upper side and near white on lower, and being resistant to rose powdery mildew.

3,996
ROSE PLANT

Seizo Suzuki, Chiba, Japan, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Nov. 3, 1975, Ser. No. 628,115
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—2 1 Claim

1. A new and distinct cultivar of rose plant of the Pillar class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous growth, of its upright pillar form, with large clusters of blooms having between 25 to 30 petals in each bloom, and possessing a bloom color similar to that of the cultivar Joseph's Coat.

3,997
ROSE

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Nov. 17, 1975, Ser. No. 632,762
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—11 1 Claim

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its vigorous, well branched growth, an abundance of large, dark green, semi-glossy foliage with blooms of near white with pronounced tinting of Azeala Pink and very little fragrance, and with numerous stipitate glands on the edge and outer surface of sepals on the rachis.

3,998
ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Nov. 24, 1975, Ser. No. 634,666
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—11 1 Claim

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its medium green, leathery textured foliage; vigorous upright and open habit of growth; flowers of 20 to 30 large round petals; flower color of Orient Pink, when protected from the sun before opening, darkening to Rose Opal when fully open.

PLANT PATENTS

GRANTED DECEMBER 31, 1974

Illustration for plant patents are mostly in color and therefore it is not practicable to reproduce them herein.

3,922

ROSE BUSH

Lawrence T. Irwin, P.O. Box 657, Canton, Tex. 75103

Filed Sept. 3, 1974, Ser. No. 502,781

Int. Cl.² A01H 5/00

U.S. Cl. PP—22 1 Claim

[illegible]

3,923

ROSE BUSH

Lawrence M. Sharp, 2500 Box Elder Ave., Raleigh, N.C. 27612

Filed Sept. 23, 1974, Ser. No. 508,222

Int. Cl.² A01H 5/00

U.S. Cl. PP—31 1 Claim

[illegible]

3,924

ROSE BUSH

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 16, 1972, Ser. No. 297,962

Int. Cl.² A01H 5/00

U.S. Cl. PP—28 1 Claim

[illegible]

3,925

ROSE BUSH

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 16, 1972, Ser. No. 297,963

Int. Cl.² A01H 5/00

U.S. Cl. PP—11 1 Claim

[illegible]

3,926

ROSE BUSH

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Oct. 16, 1972, Ser. No. 297,964

Int. Cl.² A01H 5/00

U.S. Cl. PP—22 1 Claim

[illegible]

PATENTS

GRANTED DECEMBER 21, 1976

ERRATA

For CLASS	See PATENT NO.
333–701	3,997,973
125–023 C	3,998,201
267–102	3,998,371
074–018.2	3,998,466
429–196	3,998,657
429–194	3,998,658
429–196	3,998,660
210–062	3,998,714
424–047	3,998,788
536–024	3,998,806
536–023	3,998,807
264–249	3,998,824
358–259	3,999,005
358–085	3,999,006
358–104	3,999,007
358–128	3,999,008
358–128	3,999,009
358–302	3,999,010
432–060	3,999,038
248–510	3,999,059
303–063	3,999,075

PATENTS

GRANTED DECEMBER 21, 1976

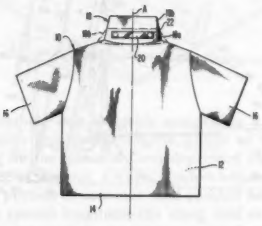
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

3,997,920
DRESS SHIELD
Irvin S. DeWoskin, St. Louis, Mo., assignor to Beltx Corporation, Barnhart, Mo.
Filed Aug. 19, 1975, Ser. No. 605,912
Int. Cl.² A41D *27/12*
U.S. Cl. 2—53 **4 Claims**

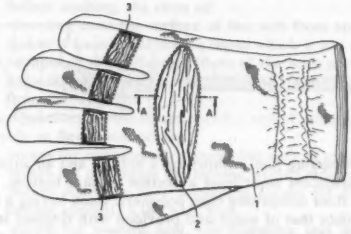
1. A dress shield comprising two pieces of composite material each having a concave inner edge and an outer edge, each piece being formed of a laminated material comprising a central waterproof barrier layer of flexible heat-sealable plastic film and outer layers of spun-bonded polyester material bonded to said central layer, said pieces being disposed flatwise one against the other with their concave inner edges generally in register with one another, said pieces being seamed together in face-to-face relation along their said concave inner edges by a heat seal extending along said concave edges, and otherwise being free of one another for being folded outwardly one away from the other at the heat seal, the heat seal being continuous all along said concave edges and extending through the polyester material on the outside of one piece, the plastic film layer of said one piece, the polyester material on the inside of said one piece, the polyester material on the inside of the other piece, the plastic film layer of said other piece, and the polyester material on the outside of said other piece.

3,997,921
BABY GARMENT
William E. Knight, 5000 Park Place, Bethesda, Md. 20016
Filed June 30, 1975, Ser. No. 591,613
Int. Cl.² A41D *11/00*
U.S. Cl. 2—75 **8 Claims**



1. In combination with a garment for a baby or child to be worn over the body of the child and having a front side, a back side and neck and shoulder portions; a control handle attached to the upper back side of the garment to be grasped by the hand of an adult for controlling a child wearing the garment, said handle having spaced opposite end portions and extending between the opposite end portions thereof in close proximity to the back side of the garment adjacent to said neck and shoulder portion with the longitudinal axis of the back side of the garment generally coinciding with the mid point of the handle equidistant the opposite end portions of the handle, the length of the handle between said end portion thereof being of length to permit a plurality of fingers of an adult to be placed in the space between the handle and the back side of the garment for grasping the handle, and means permanently attaching the opposite end portion of the handle to the garment so that the handle is a permanent part of the garment at all times and so that the handle is capable of withstanding forces tending to separate the handle from the garment when the child falls or pulls away from a person grasping the handle.

3,997,922
GLOVE
Birger Johannes Huhta, Hakalaxgatan 79-81 A, Gamlakarleby 10, Finland
Filed May 12, 1975, Ser. No. 576,490
Claims priority, application Finland, May 15, 1974, 1503/74
Int. Cl.² A41D *19/00*
U.S. Cl. 2—161 A **3 Claims**

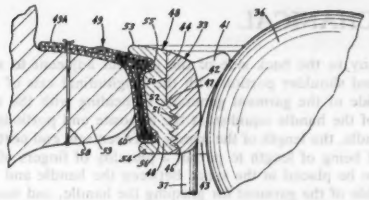


1. For use in cross country skiing a glove having a palm, a back and two sides, wherein said back has transverse cuts at least at the location of the knuckles and finger first joints, said cuts extending transversely across the glove and terminating short of the sides, and wherein inserts of flexible covering material are seated within the cuts and secured to said glove back only at the edges of said cuts, the lengths of said inserts in the longitudinal direction of the glove being greater than the width of the respective accommodating transversely extending cuts whereby, upon a clenching motion of the fist to increase the width of the cuts, the inserts take up the increased width of the cuts.

3,997,923
HEART VALVE PROSTHESIS AND SUTURING ASSEMBLY AND METHOD OF IMPLANTING A HEART VALVE PROSTHESIS IN A HEART
Zinon C. Possis, Edina, Minn., assignor to St. Jude Medical, Inc., Columbia Heights, Minn.
Filed Apr. 28, 1975, Ser. No. 572,001
Int. Cl.² A61F *1/22*
U.S. Cl. 3—1.5 **35 Claims**

18. A suturing assembly attachable to heart tissue for releasably holding a heart valve prosthesis, comprising: an annular member having means for releasably holding the heart valve prosthesis cover means surrounding the annular member, means holding the cover means on the annular member and lock means movably mounted on the annular member locat-

able in a release position to allow the heart valve prosthesis to be mounted on and removed from the annular member and



locatable in a lock position to hold the heart valve prosthesis in a fixed position relative to the annular member.

3,997,924

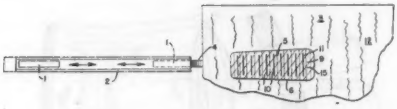
SWIMMING POOL WITH AUXILIARY FRACTURABLE FLOOR FOR BREAKING FALL OF DIVER IN UNDULY RAPID DESCENT

Harold A. Jewett, 5451 42nd St., NW., Washington, D.C. 20015

Continuation-in-part of Ser. No. 596,173, July 15, 1975. This application Oct. 6, 1975, Ser. No. 620,143

Int. Cl.[2] E04H *3/16, 3/18;* **F16L** *21/02*

U.S. Cl. 4—172 **5 Claims**



1. A swimming pool comprising a bottom and an auxiliary floor suprajacent to at least a portion of said bottom, said auxiliary floor comprising rigid polymeric foam having a density less than that of water and provided with retainer structure for holding said floor in place during use of said pool, comprising

a. a wall surface disposed for blocking lateral displacement of peripheral portions of said floor,

b. a downward facing surface disposed for blocking upward displacement of such peripheral portions, and

c. discrete pieces of weighting material carried by said floor, said weighting material having a specific gravity greater than that of water whereby upward bowing of said floor due to buoyant force of pool water beneath it is at least alleviated.

3,997,925

APPARATUS TO CONTROL THE WATER LEVEL IN A SWIMMING POOL

William D. Hough, 2611 Poinsettia Drive, McKeesport, Pa. 15131

Filed May 21, 1975, Ser. No. 579,315

Int. Cl.[2] E04H *3/16, 3/18;* **F16L** *21/02*

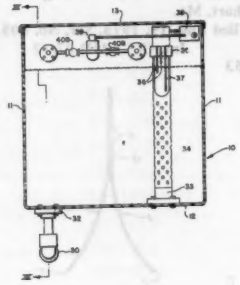
U.S. Cl. 4—172.17 **8 Claims**

1. Apparatus to maintain the water level in a swimming pool at a desired elevation along the side walls surrounding the periphery of the swimming pool, said apparatus including, in combination:

a stilling chamber supported externally of the swimming pool, said stilling chamber having side walls to define a chamber height situated at the same elevation so as to include the elevation of the desired water level in the swimming pool,

an equalizer pipe extending in open communication between said stilling chamber and the water contained by the walls of the swimming pool at an elevation essentially below the desired water level to thereby maintain the same water level in both the stilling chamber and the swimming pool,

a water supply pipe including valve means to control the flow of make-up quantities of water into the swimming pool,



detector means at the desired pool water level in said stilling chamber to control said valve means in response to the detected water level therein in a manner to maintain the water level in the swimming pool at the desired elevation, said detector means including a secondary stilling chamber member having a perforated wall supported in said stilling chamber, and

probe means extending into said secondary stilling chamber member to an elevation coinciding with the desired elevation to the water level in the swimming pool.

3,997,926

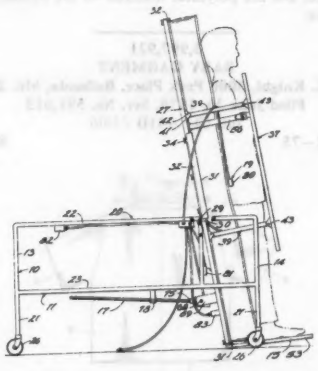
BED WITH AUTOMATIC TILTING OCCUPANT SUPPORT

Robert W. England, Rte. 3, Box 356, Cheney, Wash. 99041

Filed July 9, 1975, Ser. No. 594,346

Int. Cl.[2] A61G *7/10*

U.S. Cl. 5—62 **8 Claims**



1. A bed for raising and lowering an occupant between a prone or supine position and an upright standing position, comprising:

an elongated leg supported framework having a pair of laterally spaced parallel upright side frames extending longitudinally from a foot end to a head end thereof;

longitudinal horizontal side frame rails extending from head to foot ends of the side frames;

a flat rigid occupant support platform pivotably mounted between the side frame rails for pivotal movement about a horizontal platform pivot axis between a horizontal position and an upright position;

wherein said horizontal platform pivot axis is located longitudinally intermediate the foot and head ends of the framework such that the rails of said side frames may be utilized as hand rails when the platform is in the upright position;

first abutment means for preventing pivotal movement of the platform in one direction past the horizontal position;

second abutment means on the side frames for preventing pivotal movement of the platform in an opposite direction past the upright position;

cross members extending transversely across the framework to join the side frames together, said cross members being located at longitudinal positions on the framework between the horizontal pivot axis and the head end of the framework so as not to obstruct access to the platform when in the upright position;

a foot rest assembly mounted to the support platform assembly adjacent the foot end;

a bracket mounted to an underside of the occupant support platform for pivotal movement about a fixed horizontal bracket pivot axis spaced toward the foot end from the platform pivot axis;

a screw shaft;

a nut mounted to the framework for pivotal movement about a fixed transverse axis and threadably receiving one end of the screw shaft;

drive means on the bracket receiving the remaining end of the screw shaft and for rotating the screw shaft; and

control means for selectively actuating the drive means to move the occupant platform between the horizontal and upright positions.

3,997,927

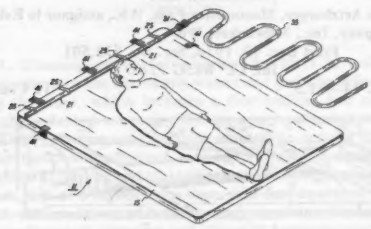
SUNBATHING MAT ASSEMBLY

Robert L. Culligan, 624 Bailey Road, West Henrietta, N.Y. 14586

Filed Nov. 28, 1975, Ser. No. 636,141

Int. Cl.² A47G 9/00; A47C 21/04

U.S. Cl. 5—344 **2 Claims**



1. A sunbathing mat assembly comprising a compressible mat sufficiently flexible so that the weight of the body of a person lying on the mat will form depressed channels in the upper surface of the mat, a water conduit adjacent said upper surface of a portion of said mat, said conduit having a row of perforations spaced longitudinally along said conduit, means for securing said conduit to said mat approximately along an edge thereof to direct said perforations toward said upper surface of said mat, and means for coupling said conduit to a water supply for supplying water to said conduit to flow into the conduit and out through the perforations thereof and directly downward onto the upper surface of the mat and along some of said depressed channels to cool a lower portion of said body without wetting an upper portion of said body exposed to the sun's rays.

3,997,928

METHOD FOR THE TREATMENT OF TEXTILE, FLEECE AND SIMILAR WEBS

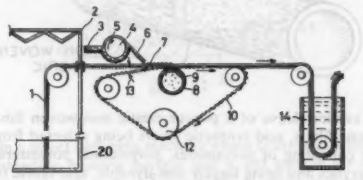
Ferdinand Leifeld, Kempen, Germany, assignor to Eduard Kusters, Krefeld-Forstwald, Germany

Filed Jan. 27, 1975, Ser. No. 545,345

Claims priority, application Germany, Jan. 26, 1974, 2403815

Int. Cl.² D06B 1/06, 15/04

U.S. Cl. 8—149.1 **10 Claims**



1. In a method for the treatment of a web of material such as a textile or fleece material which comprises the steps of:

a. continuously moving the web;

b. patterning the web;

c. fixing the pattern; and

d. washing out the remaining patterning treating agents the improvement comprising performing, after fixing and before washing, the steps of:

e. directing onto the surface of the web from an external source a quantity of rinsing liquid which is just sufficient to moisten the surface of fibers of the web; and

f. immediately thereafter suctioning the rinsing liquid away from the web.

4. Apparatus for the treatment of a web of material such as a textile or fleece comprising:

a. means for continuously moving the web of material;

b. means for patterning the moving web of material;

c. means following said patterning means for fixing the pattern applied to the web; and

d. means for washing said web following said means for fixing wherein the improvement comprises, disposed between said means for fixing and means for washing in the direction of travel;

e. means for directing a rinsing liquid from an external source onto the surface of and across the width of the web of material in an amount which is just sufficient to moisten the surface of fibers of the web; and

f. suction means immediately behind said means for applying rinsing liquid in the direction of travel for sucking away said rinsing liquid across the width of said web.

3,997,929

CARRIER SLEEVE

Wolfram Schultheiss, Kiefernweg, and Harald Hoffmann, Mannheim, both of Germany, assignors to Firma Carl Freudenberg, Weinheim an der Bergstrasse, Germany

Continuation of Ser. No. 398,631, Sept. 19, 1973, abandoned. This application Aug. 15, 1975, Ser. No. 605,576

Claims priority, application Germany, Sept. 29, 1972, 2247751

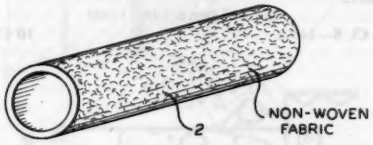
Int. Cl.² D06B 23/04

U.S. Cl. 8—155.1 **25 Claims**

1. In a method of dyeing or bleaching shrinking yarns positioned in the form of cheeses or cross-wound packages on a fiber package having a carrier sleeve by contacting said yarns with a dyeing or bleaching liquor while the same are maintained on said fiber package, the improvement which comprises utilizing as the package one whose carrier sleeve is of a thickness of at least 2 mm and is made of a porous elastic non-woven fabric of synthetic fibers, said fibers selected from

the group consisting of polyamides, polyolefins, polyesters and polyacrylics, said fabric free of any binding agent, said synthetic fibers being largely non-dyeable under the conditions of the dyeing or bleaching process.

17. A cheese or crosswound package having disposed thereon a dyeable or bleachable yarn, said package constitut-



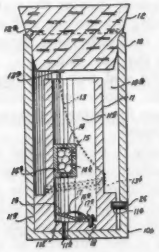
ing a carrier sleeve of a porous elastic non-woven fabric of synthetic fibers, said synthetic fibers being selected from the group consisting of polyamides, polyolefins, polyesters, and polyacrylics and being largely non-dyeable, said fabric free of any binding agent, said fabric having a thickness of at least 2 mm.

3,997,930

RETRIEVING DEVICE

James C. Reeves, P.O. Box 126, Wickett, Tex. 79788

Filed Dec. 9, 1968, Ser. No. 782,160
Int. Cl. B63b *21/52*
U.S. Cl. 9—9 1 Claim



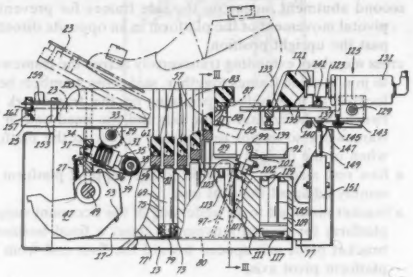
1. A retrieving device for locating a submerged object comprising: enclosure means having an opening in each end; tubular spool means secured within said enclosure means and having openings at each end in alignment with said openings in said enclosure means; stopper means releasably secured in one end of said enclosure means and having a line secured thereto, the opposite end of said line being connected to said spool means; closure means comprising a valve maintained against said aligned openings by a spring exerting a predetermined force, secured within said spool means in such manner that the aligned openings in said spool means and said enclosure means, opposite said stopper means, remain closed until said closure means is forced therefrom; basket means secured within said spool means at a position whereby the operation of said closure means in unaffected; and gas-producing means contained within said basket means, whereby said stopper means is forced from said enclosure means by gas produced by water contacting said gas-producing material after having forced said closure means from said aligned openings and having entered said spool means.

3,997,931

PAD BOX FOR ACCOMMODATING DIFFERENT SHOE BOTTOMS

Trevor Norman Coleman, Oadby; Dennis Edward Skinner, and Kenneth Charles Joseph Webster, both of Leicester, all of England, assignors to USM Corporation, Boston, Mass.

Filed Feb. 25, 1976, Ser. No. 661,358
Claims priority, application United Kingdom, Aug. 15, 1975, 34131/75
Int. Cl.² A43D *89/00, 63/00*
U.S. Cl. 12—38 7 Claims



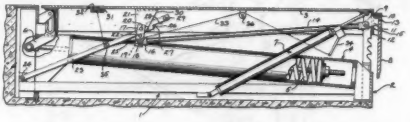
1. Apparatus for attaching a sole to the bottom of a shoe comprising means for locating and applying pressure to the shoe and its sole thereon in the heel breast line region, supporting means for applying pressure to the forepart of the shoe and which is adjustable relatively to the locating means in a direction heightwise of the locating means and about an axis extending widthwise of the shoe, a plurality of presser members arranged between the locating means and the forepart supporting means, each of said presser members being actuatable by a fluid pressure device to apply pressure to the shoe bottom, a heel presser member mounted for movement heightwise and lengthwise of the shoe, and fluid pressure operated mechanism for thus moving the heel presser member.

3,997,932

DOCKBOARD HAVING IMPROVED LIP LIFTING MECHANISM

Thomas Artzberger, Menomonee Falls, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

Filed Dec. 13, 1974, Ser. No. 532,501
Int. Cl.² B65G *11/00*
U.S. Cl. 14—71.3 11 Claims



1. A dockboard, comprising a supporting structure, a ramp hinged at its rear edge to the supporting structure and movable between a generally horizontal cross traffic position and an upwardly inclined position, a lip hinged to the forward edge of the ramp and movable between a downwardly hanging pendant position and an outwardly extending position where the lip forms an extension to the ramp, lip lifting means operably connected to the lip and including a first toggle member pivotally connected to the ramp and a second toggle member pivotally connected to the first toggle member, said toggle members being movable from a first unlocked position, wherein said toggle members are disposed at an acute angle with respect to each other, to a second locked position, said second toggle member being operably connected to the lip

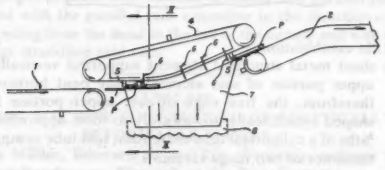
and disposed to exert to force against the underside of the lip as the toggle members are moved from the unlocked to the locked position to thereby move said lip to a partially extended position short of its fully extended position, and operating means releasibly engageable with the lip lifting means and responsive to downward movement of the ramp from the upwardly inclined position toward the horizontal cross traffic position for actuating said lip lifting means and moving the toggle members from the unlocked to the locked position to thereby move the lip from the pendant position to the partially extended position, initial upward movement of the ramp from the cross traffic position toward said inclined position acting to operably engage said operating means with said lip lifting means and subsequent downward movement of the ramp causing said operating means to operate said lip lifting means to move the lip toward the partially extended position, movement of the lip to the fully extended position as the lip engages the bed of a carrier located in front of the dock acting to remove the weight of the lip from the second toggle member and permit the toggle members to move from the locked position to the unlocked position to thereby permit the lip to return freely to the pendant position when the carrier moves away from the dock.

3,997,933

DEVICE FOR CLEARING TRAYS OF COLLECTIVITY RESTAURANTS BEFORE WASHING THEM

Patrice Garnier, Latreamont, 76360 Barentin, France

Filed Nov. 10, 1975, Ser. No. 630,170
Int. Cl.[2] A47L *15/24*
U.S. Cl. 15—102 6 Claims



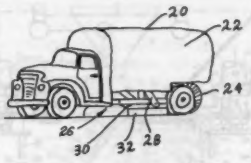
1. Cleaning device for clearing the trays of collectivity restaurants or the like of any wastes and garbage before washing the trays, which includes a first endless belt conveyor section adapted to receive the trays to be cleaned, a second endless belt conveyor section adapted to receive the trays after the cleaning thereof, said other conveyor section being dispoed at the exit end of, in alignment with, somewhat spaced from, and at a higher level than, said first conveyor section, with the upper run of both conveyor sections moving in the same direction, cleaning unit disposed between, and overlying, the exit end of said first conveyor section and the input end of said other conveyor section, said cleaning unit comprising an endless chain of which the bottom run travels in the direction from said first conveyor section to said other conveyor section, lugs on said endless chain for driving the trays delivered from said first conveyor section to said other conveyor section, and fixed means independent of said endless chains for engaging the wastes and garbage on said trays and clearing the trays thereof as said trays move past said fixed means, fixed guideways disposed on either side of said endless chain lower run and comprising a pair of lateral slideways adapted to carry the marginal portions of said trays and inclined upwardly in the direction of travel thereof, and a hopper underlying the lower run of the endless chain for collecting the wastes and garbage detached from the trays by said waste and garbage engaging means of said endless chain.

3,997,934

DIRT RUNNER AND SUPPORT THEREFOR

Leonard E. Toews, Greensburg, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Apr. 10, 1975, Ser. No. 566,955
Int. Cl.[2] E01H *1/04*
U.S. Cl. 15—246 5 Claims



1. In a street sweeping machine which comprises a fore and aft extending housing portion and a dirt runner for sliding engagement with surface beneath the machine and mounted on said housing portion in depending relation thereto; said dirt runner comprising an elongate member extending in the fore and aft direction of the machine and rectangular when viewed from above, said member having a top surface and also having a bottom surface for sliding engagement with a pavement surface, said bottom surface having a longitudinal groove formed therein, and blocks of cemented hard metal carbide material disposed therein and fixed to said member, means upstanding from said top surface of said member for engagement with connector means to connect the member to the housing portion of the street sweeping machine, and said connector means comprising a fore and aft extending elongate strip of elastomeric material connected along the upper edge to the housing portion of the street sweeping machine and along the upper edge to said means upstanding from said member.

3,997,935

WINDSHIELD WIPER BLADE TREATMENT

Raymond P. Porter, North Dartmouth; Kenneth L. Manchester, Westport, and Peter T. K. Shih, South Dartmouth, all of Mass., assignors to Acushnet Company, New Bedford, Mass.

Filed May 29, 1975, Ser. No. 581,829
Int. Cl.[2] B60S *1/04*
U.S. Cl. 15—250.36 14 Claims

1. A method of treating elastomeric implements for wiping of smooth surfaces such as glass comprising:

a. treating the elastomeric implement with a halogen, and thereafter;

b. treating the halogenated elastomeric implement for at least about 15 minutes with a solution selected from the group consisting of solutions having a pH above about 12 and solutions having a pH from 7 to 12 and having a cation concentration of at least $-0.09\ pH + 1.13$ moles per liter where pH is the pH of the solution.

3,997,936

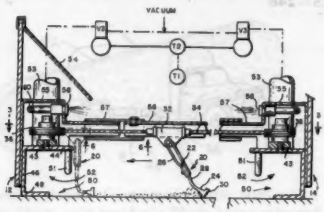
VACUUM CLEANING APPARATUS

Sumner Smith, Jr., Cohasset; Wladyslaw Typrowicz, Westford, and Horst M. Leonhardt, Brockton, all of Mass., assignors to Abington Incorporated, North Abington, Mass.

Filed Nov. 24, 1975, Ser. No. 634,925
Int. Cl.[2] D01G *15/76*
U.S. Cl. 15—301 14 Claims

1. Apparatus for continuously removing waste from beneath a machine, comprising a structure designed to be installed on the floor beneath the machine, a wiper supported on the structure for reciprocal movement along the floor and in engagement therewith for sweeping the entire area of the floor

beneath the machine transversely in the direction of reciprocal movement, means connected to the wiper for effecting reciprocal movement thereof, a vacuum chamber at each end of the structure situated transversely of the direction of reciprocal movement of the wiper having an open side facing the wiper and open ends each of said open sides being adapted to



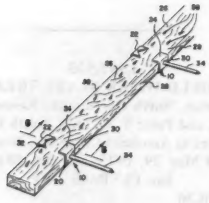
be closed by the wiper as it moves to an end position adjacent the corresponding open side, a vacuum port midway between the open ends of each of the chamber and means for sequentially connecting each of the vacuum port to a source of vacuum simultaneously with the movement of the wiper to a position closing the open side of the corresponding one of the vacuum chamber.

3,997,937

CARPET TACK STRIP ANCHORING MEANS AND INSTALLATION TOOL

Michael F. Manguso, 3743 E. Coronado, Phoenix, Ariz. 85008

Filed Aug. 7, 1975, Ser. No. 602,664
Int. Cl.² A47G 27/04
U.S. Cl. 16—6 7 Claims



1. A clip having normally horizontal bottom portion; said horizontal bottom portion having opposite ends provided with upstanding portions; said upstanding portions having clip portions extending toward each other in a normally horizontal disposition; one of said upstanding portions having a nail receiving opening therethrough and wherein a carpet holding tack strip is held in the confines of said bottom, extending portions and said clip portions.

3,997,938

DUAL WHEEL CASTER ASSEMBLY

Lon W. Pinaire, Prospect, Ky.; Robert H. Godwin, and John M. Freeman, both of Evansville, Ind., assignors to Bliss & Laughlin Ind., Inc., Oak Brook, Ill.

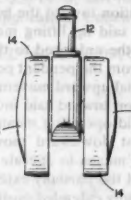
Filed Aug. 25, 1975, Ser. No. 607,109
Int. Cl.² B60B 33/00
U.S. Cl. 16—45 16 Claims

15. A dual wheel caster comprising:

a horn having swivel means and a pair of wheels thereon; and

a wheel hub shield mounted to at least one of said wheels on the face of said wheel opposite said horn and rotatable with said wheel, said shield covering a major portion of the face of said wheel,

each of said wheels having a tread and rim adjacent the tread, the rim of each wheel having a radially inward facing groove therein, and a wheel hub shield having a greater diametrical distance across outer edge portions



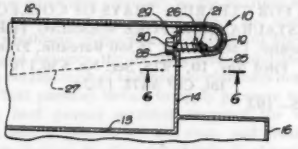
than the diametrical distance across inner edge portions of said groove at the entrance to said groove whereby each of said shields is retained in its respective groove after it is snapped into its respective groove.

3,997,939

TRUCK BODY HINGE

Irven R. Wilhelmsen, 6359 Dominica St., Cypress, Calif. 90630

Filed Sept. 29, 1975, Ser. No. 617,423
Int. Cl.² E05D 1/06
U.S. Cl. 16—171 3 Claims



1. In combination:

a sheet metal structural element supported vertically, an upper portion of said element being bent horizontally therefrom, the free edge of said upper portion being shaped cylindrically downwardly to form approximately ⅝ths of a cylindrical tube therefrom, said tube comprising the inner of two hinge elements;

a second flat sheet metal structural element resting on, when closed, and overlapping said first hinge element, the edge portion of said second structural element being shaped downwardly cylindrically to form therefrom a second hinge element comprising approximately ⅝ths of a cylindrical tube, said second hinge element approximately concentrically telescopically enclosing said first hinge element therein, the gap between the terminal lip of said second hinge element and said second sheet metal structural element being such as to prevent broadside separation of said two hinge elements after they have been telescopically fitted together; and

means for retaining said hinge elements against relative telescopic shifting which would separate the same.

3,997,940

DOUBLE-RAIL ANIMAL SECURING ASSEMBLY

Ralph P. Prince, Storrs; Paul E. Belanger, Mansfield Center, both of Conn., and Rudy G. Westervelt, Newfield, N.Y., assignors to Council of Livestock Protection, Inc., New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,433
Int. Cl.² A22B 1/00
U.S. Cl. 17—1 A 2 Claims

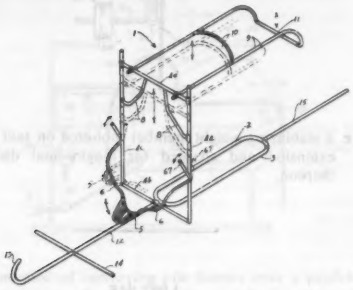
1. A double rail conveyor system for slaughtering animals, comprising

a movable frame having a bottom bar and two parallel vertical bars extending upward from the ends of said bottom bar;

a set of two parallel horizontally disposed rails connected to said bottom bar;

a neck stretcher means comprising a jaw holder and a pair of rods connecting said jaw holder pivotally to said vertical bars of said frame and means for pivotally moving said jaw holder vertically about a pivot point on said vertical bars;

a pair of flexible strips mounted on said two vertical bars for holding the neck of said animal; and



a back holding cage comprising a pair of horizontally disposed bars and a semicircular cross bar connected to said horizontally disposed bars, said pair of horizontally disposed bars connected movably to said vertical bars for holding the back of the animal, said back holding cage being vertically movable to come into contact with the back of the animal, whereby said animal is held in an upright position with its belly touching said parallel rails and with the parallel rails extending in the direction extending from the head to the tail of the animal and with its legs straddling said rails.

3,997,941

FILLING MACHINE FOR STUFFING OF PLASTICALLY DEFORMABLE MASSES

Johann Müller, Biberach an der Riss, Germany, assignor to Albert Handtmann, Biberach an der Riss, Germany

Filed Oct. 15, 1974, Ser. No. 515,010

Claims priority, application Germany, Oct. 18, 1973, 2352229

Int. Cl.² A22C *11/02*

U.S. Cl. 17—35 7 Claims

1. A machine for filling a tube such as a sausage casing with a mass of plastically deformable material such as a sausage filling mass, comprising:

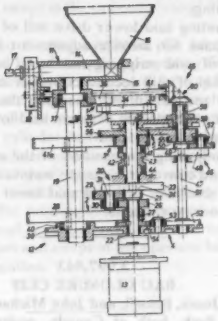
a motor having a drive shaft;

a three-part differential gear assembly having a first gear part, a second gear part and a third gear part, said gear parts intermeshing for mutual differential rotation of said first and second parts, said third part of said differential gear assembly being connected to said shaft for driving of said third part and said assembly whereby an increase in speed of said first part results in a reduction of speed of said second part and vice versa;

a pump having an element rotatable for ejecting said mass of plastically deformable material into said tube with a volume proportional to the angular displacement of said element in a predetermined sense, said element being intermittently displaceable to control the rate of displacement of said mass;

an intermittent-drive arrangement connected to said element and rotatable to intermittently displace said element;

a first gear train connecting said first part of said differential gear assembly with said intermittent drive for rotating same upon rotation of said first part of said differential gear assembly; and



a second gear train connecting said second part of said differential gear assembly with said element for rotating same upon rotation of said second part of said differential gear assembly.

3,997,942

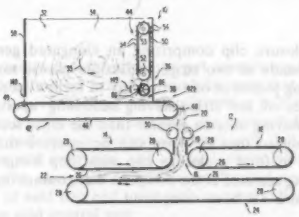
BATT FORMING AND FEEDING APPARATUS

George S. Buck, Jr., and Roger Russell, both of Memphis, Tenn., assignors to Cotton Incorporated, Raleigh, N.C.

Filed Dec. 12, 1974, Ser. No. 532,001

Int. Cl.² D01G *25/00*

U.S. Cl. 19—155 2 Claims



1. Cotton batt feeding apparatus comprising:

frame means including lateral and upright portions;

cotton retention chamber means on said frame and including a batt exit opening;

first conveyor means in the form of an endless belt on said lateral frame portion for conveying cotton in a generally lateral direction toward said exit opening;

second conveyor means on said frame portion in the form of an endless belt for conveying cotton in said chamber away from said batt exit opening in an upright direction generally transverse to said lateral direction and including an upper idler roll and a lower drive roll spaced from said first conveyor means;

said first and said second conveyor means serving as floor and and end wall portions respectively of said chamber means and being operable to enforce circulation of cotton in said chamber means to establish a rotating batt supply body;

stripping means disposed on said frame means between said

lower drive roll of said second conveyor means and said first conveyor means and spaced form said first conveyor means to define the exit opening therebetween;

means for driving said lower drive roll of said second conveyor means and said stripping means, the latter being rotated in a direction to strip a batt of cotton from the rotating batt supply body and direct the batt through the exit opening;

means mounting said lower drive roll of said second conveyor means for arcuate adjustment about the axis of rotation of said stripping means to adjust the angular relationship of said second conveyor means to said first conveyor means without changing the size of said exit opening or the spacing between said lower drive roll and said stripping means; and

means for adjusting the position of the upper idler roll of said second conveyor means to maintain uniform spacing between said idler roll and said lower drive roll of said second conveyor means.

3,997,943

BAG CLOSURE CLIP

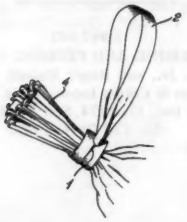
Elwyn David Jones, Beloeil, and John Michael Charles Ridden, Otterburn Park, both of Canada, assignors to Canadian Industries, Ltd., Montreal, Canada

Filed Jan. 23, 1976, Ser. No. 651,695

Claims priority, application United Kingdom, Feb. 18, 1975, 6774/75

Int. Cl.² B65D *63/00*

U.S. Cl. 24—30.5 P 5 Claims



1. A closure clip comprising an elongated generally flat member made of two strips of flexible plastic material, the strips being joined at one extremity to form a loop, the other extremities of the strips having matching apertures, each aperture having an area greater than the cross-sectional area of the loop so that the loop can be inserted through both apertures to form a closure clip with loop hanger, the said strips being serrated at the positions that contact the apertures after closure has been completed.

3,997,944

DRAPERY HOOK FOR MAINTAINING A DRAPERY HEADING IN UPRIGHT POSITION

Carl Ferman Phillips, Rte. 1, Moncure, N.C. 27559

Filed Sept. 29, 1975, Ser. No. 617,685

Int. Cl.² A47H *13/04*

U.S. Cl. 24—86 C 1 Claim

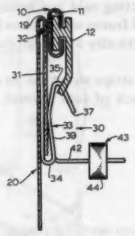
1. A drapery hook for mounting and suspending drapery from a drapery rod and adapted to allow the heading of said drapery to be maintained in a substantially vertical position, said drapery hook being formed from an integral length of wire material and comprising:

a. a pointed pin portion having an upper pointed end and a lower heel end and adapted for insertion into said drapery heading;

b. a clamp portion extending upwardly from the heel of said pin portion;

c. a U-shaped portion extending from the upper end of said clamp portion, said U-shaped portion adapted to hang over said drapery rod and be suspended therefrom;

d. a stabilizing extension portion extending from said clamp portion at substantially a right angle to said pin portion; and



e. a stabilizing weight member mounted on said stabilizing extension and adapted for longitudinal displacement thereon.

3,997,945

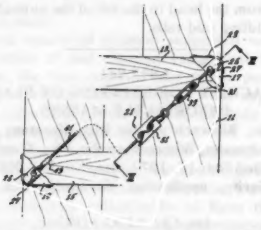
APPARATUS FOR EXERTING A COMPRESSIVE FORCE INCLUDING FRICTION GRIPPING DEVICE THEREFORE

Milton Robins, Marina Del Rey, Calif., assignor to PTI - Dolco, Los Angeles, Calif.

Filed Dec. 8, 1975, Ser. No. 638,886

Int. Cl.² F16G *11/00*; A45F *1/16*; E21B *19/00*

U.S. Cl. 24—129 R 10 Claims



1. Apparatus for applying a compression force comprising a plurality of gripping means,

tensioning means for flexibly joining said gripping means including

first, second, third, and fourth portions thereof, and means for prohibiting inadvertent release of said tensioning means comprising

plate means including

a plurality of apertures therein located along a substantially straight line,

said first tensioning means portion being fixedly attached to one of said gripping means,

said second tensioning means portion is extended consecutively through the first and last apertures of said plurality of apertures in said plate means,

said third tensioning means portion comprising a loop for attachment to one of said plurality of gripping means, and

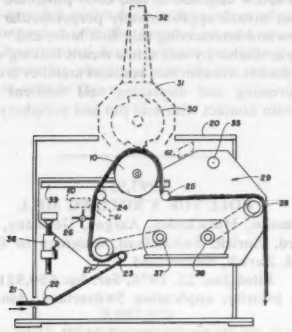
said fourth tensioning means portion is extended consecutively through two apertures, intermediate the first and last apertures, of said plurality of apertures in said plate means.

3,997,946

METHOD FOR CONVEYING PATTERNED PILE FABRICS

Heinz Hergert, Frankfurt am Main, Germany, assignor to Polrotor Inc., N. Amityville, N.Y.

Continuation of Ser. No. 426,828, Dec. 20, 1973, abandoned, which is a division of Ser. No. 147,585, May 27, 1971, Pat. No. 3,785,016. This application Apr. 14, 1975, Ser. No. 567,932
Int. Cl.² D06C *15/00, 23/00*
U.S. Cl. 26—2 R 10 Claims



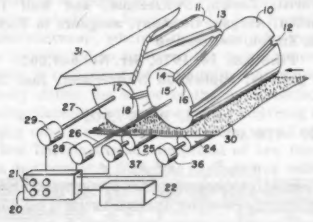
1. The method of conveying pile fabrics over a predetermined path between feeder and delivery rolls for processing by pile modifying equipment having a degree of effectiveness determined by the distance of the fabric therefrom, comprising: driving said feeder and delivery rolls to convey said fabric under controlled tension past said equipment; continuously supporting said fabric with a rigid surface of irregular contour on the side remote from said equipment to establish the proximity of selected portions of the fabric to the equipment within a predetermined range; and adjustably positioning said rigid surface, said feeder roll simultaneously about a common axis, and said delivery roll, without affecting said controlled tension, to establish the proximity of said range to said equipment.

3,997,947

METHOD AND APPARATUS FOR PILE FABRIC FINISHING WITH A PLURALITY OF ELECTRIFIER CYLINDERS

Heinz Hergert, Frankfurt am Main, Germany, assignor to Polrotor Inc., N. Amityville, N.Y.

Continuation-in-part of Ser. No. 384,092, July 30, 1973, abandoned. This application Apr. 16, 1975, Ser. No. 568,592
Int. Cl.² D06C *29/00, 23/02*
U.S. Cl. 26—2 E 10 Claims



1. In a method of treating synthetic pile fabric to establish any desired lateral lay of the pile, involving transporting said fabric along a predetermined path, subjecting the fibers of said fabric for a controlled period of time to beating, electrification and heating as it passes a first location along said path, and thereafter subjecting the fibers of said fabric for a second controlled period of time to beating, electrification and heating as it passes a second location along said path, said second location being adjacent to said first location; the improvement comprising biasing the lay of said fibers in a first lateral direction only at said first location, and biasing the lay of said fibers in the opposite lateral direction only at said second location, whereby said fibers are swept in a first lateral direction at said first location and swept in the opposite lateral direction at said second location.

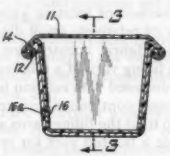
7. Apparatus for treating synthetic pile fabric to establish any desired lateral lay of the pile, comprising first and second adjacent electrifier cylinders mounted for rotation about parallel axes, said first cylinder having longitudinal grooves in the surface thereof inclined in a first direction from the axis only and said second cylinder having longitudinal grooves in the surface thereof inclined in the opposite direction from the axis only, means for transporting said fabric along a path substantially orthogonal to said axes and in proximity to said cylinders, and means for rotating said cylinders at various rates of speed, whereby said fibers are swept in a first lateral direction at said first location and swept in the opposite lateral direction at said second location.

3,997,948

MODULAR PET BURIAL CASKET

Keith P. Hicks, 4121 Roberts Road, Fairfax, Va. 22030, and Jacob H. Steinberg, 2631 E. West Highway, Chevy Chase, Md. 20015

Filed Oct. 30, 1975, Ser. No. 627,336
Int. Cl.² A61G *17/00*
U.S. Cl. 27—2 11 Claims



1. A resinous casket for a large pet comprising interfitting u-shaped longitudinal extending modular units that are fixedly united by a cover locking means wherein a pair of complementary end units open at one end, are connected by sliding said open ends into a central u-shaped unit that is slightly larger than said end units, and having bottom locking means provided with elongated tongue means located near the bottom edge of said two end units with correspondingly shaped grooves on said central unit.

3,997,949

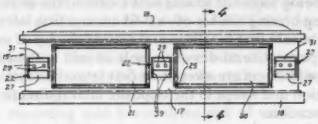
CASKETS AND VAULTS FOR USE IN SIDE-BY-SIDE BURIALS

Maynard W. Waltz, 91 Smith St., South Portland, Maine 04106

Filed Jan. 22, 1975, Ser. No. 543,156
Int. Cl.² A61G *17/00*
U.S. Cl. 27—2 10 Claims

1. A casket comprising a body-receiving chamber and a cover therefor, handles secured to the sides of said chamber and including hand grips, said handles including bases, and supporting means connecting said hand grips to said bases with the hand grips located along the transverse center lines thereof at least when the casket is being carried, and with the

supporting means wholly on one side thereof, and means attaching said bases to said sides with said hand grips parallel



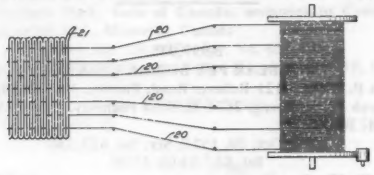
whether the bases are positioned with the supporting means above or below the center lines.

3,997,950

METHOD OF TREATING LARGE DIAMETER YARNS TO PROVIDE BULKING DYED AND/OR MOTTLED EFFECTS IN FABRIC

Kirkland H. Gibson, North Kingstown, R.I., assignor to H. G. P. Corporation, Johnston, R.I.

Filed May 9, 1975, Ser. No. 576,190
Int. Cl.² D04B *19/00*
U.S. Cl. 28—72.16 4 Claims



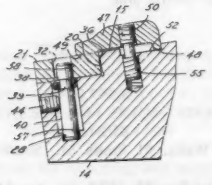
1. An improved method of treating yarn which comprises providing a plurality of relatively small diameter warp yarns, weaving in a selected fabric construction, said warp yarns under tension with a filling yarn of a relatively larger diameter than the warp yarns disposed with relation to the warp yarns in a relatively untensioned continuous unravelable relation and treating said fabric to treat the filling yarns and unraveling said filling yarn to provide a treated yarn for reworking into various forms.

3,997,951

CUTTING TOOLS

Bruce Williscraft, Clinton, Canada, assignor to Ex-Cell-O Corporation, Troy, Mich.

Continuation of Ser. No. 505,188, Sept. 11, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,849
Int. Cl.² B26D *1/00*
U.S. Cl. 29—96 10 Claims



1. In a cutting tool
a. a disposable cutting insert having a hole substantially at the geometric center;
b. a body providing a flat bottom support surface and at least one side wall which forms a pocket means against which said insert rests;
c. a first hole communicating with and perpendicular to said bottom support surface co-axial with a second smaller blind and recessed hole disposed in said body;
d. a cylindrical pin means with one end pivotally disposed within the limits of said second hole and having an undercut portion thereon and having a resilient member disposed on said pin in said undercut portion and flush with said bottom of pocket wherein said resilient member is sized to fill void between said pin and said first hole the other end of said pin projecting into hole of said insert;
e. a set screw disposed in said body projected toward said pocket means approximately perpendicular to said pin means and intersecting said first hole; and
f. said pin tiltable by said screw means locking said insert in said pocket wherein said resilient member is deformed by compressing and displacing said resilient member to maintain contact with said pin and periphery of said first hole

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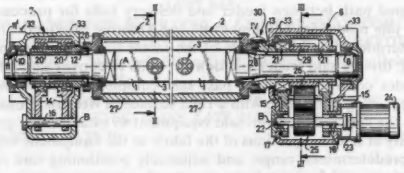
3,997,952

ROLL FOR A ROLLING MILL

Rolf Lehmann, Mutschellen, Aargau, Germany, and Armin Siegfried, Zurich, Switzerland, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Jan. 21, 1976, Ser. No. 650,921
Claims priority, application Switzerland, Jan. 29, 1975, 1059/75
Int. Cl.² B60B *15/16*
U.S. Cl. 29—115 10 Claims



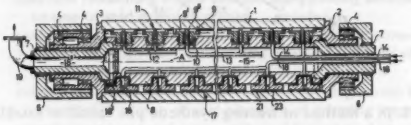
1. A sag-compensating roll for a rolling mill comprising a roll shell rotatable about a support beam, hydrostatic support means positioned between said support beam and said shell for exerting support forces on the shell, a pair of casings at respective ends of said roll, means for mounting the ends of said support beam in said casings, pivotally mounted arms in said casings pivotable about an axis spaced from the axis of rotation of said roll shell, and means for rotatably mounting end sections of said roll shell on said arms.

3,997,953

TEMPERATURE-CONTROLLED ROLL FOR A ROLLING MILL

Alfred Christ, Zurich, Switzerland, and Rolf Lehmann, Mutschellen, Aargau, Germany, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Jan. 14, 1976, Ser. No. 649,062
Claims priority, application Switzerland, Jan. 20, 1975, 636/75
Int. Cl.² B21B *13/02*
U.S. Cl. 29—116 AD 12 Claims



1. In a sag-compensating roll for a rolling mill including a roll shell rotatable about a support beam, and hydrostatic

supporting piston means mounted on said support beam for exerting support forces on said shell, temperature control means for said shell comprising at least one heat-control device remote from said supporting piston means, said heat-control device comprising a piston mounted in a chamber supported by said beam and an operating plated on said piston facing the inner surface of said roll shell, conduit means for introducing a heat-control liquid vehicle into said chamber to press said operating plate toward the inside of said shell, and at least one grooved outlet duct in the surface of said operating plate connected with the interior of said chamber, said piston and heat-control liquid vehicle producing a gap between said operating plate and said shell in which the heat-control liquid vehicle flows.

3,997,954

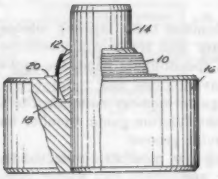
LOW FRICTION BEARING PREPARED BY WINDING ONTO A MANDREL

Charles S. White, 35815 42nd St., East, Palmdale, Calif. 93550

Continuation-in-part of Ser. No. 511,171, Oct. 2, 1974, and Ser. No. 458,559, April 8, 1974, said Ser. No. 511,171, is a continuation-in-part of Ser. No. 458,860, April 4, 1974, Pat. No. 3,874,050, which is a continuation of Ser. No. 334,192, Feb. 20, 1973, and a continuation-in-part of Ser. No. 316,844, Dec. 20, 1972, Pat. No. 3,891,488, which is a continuation-in-part of Ser. No. 76,110, Sept. 28, 1970, abandoned, said Ser. No. 458,559, is a continuation-in-part of Ser. No. 321,566, Jan. 8, 1973, and said Ser. No. 76,110. This application Oct. 14, 1975, Ser. No. 622,005

Int. Cl.² B21D *53/10*

U.S. Cl. 29—149.5 B **12 Claims**



1. In a method of preparing a low friction bearing having an inner bearing member, a housing and a low friction surface element therebetween, wherein the housing having an inner surface is constructed to surround the bearing member and said housing is comprised of a plurality of sections which cooperatively define the shape of the outer surface of the inner bearing element, the improvement comprising the steps:
1. winding onto a mandrel a continuous strand of a bondable low friction thread comprised of low friction filaments and bondable filaments impregnated with a bondable resin which is in a solidified yet thermoplastic state;
2. affixing the wound thread to the inner surface of at least one housing section;
3. curing the resin to coalesce the threads and integrate the turns of the threads to produce a low friction element; and
4. then assembling the bearing by constructing the housing sections about the inner bearing element, at least one of the housing sections having the cured low friction element on the inner surface thereof.

3,997,955

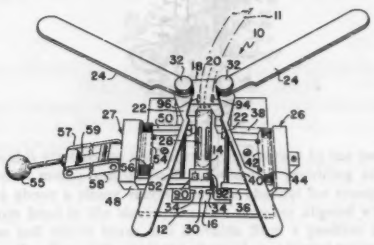
APPARATUS FOR TERMINATING A PLURALITY OF INSULATED CONDUCTORS IN RESPECTIVE INSULATION-PIERCING CONTACTS OF AN ELECTRICAL CONNECTOR

William Stephen McCaughey, Oak Brook, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation-in-part of Ser. No. 407,780, Oct. 19, 1973, abandoned. This application Feb. 14, 1974, Ser. No. 442,459

Int. Cl.² H01R *43/04*

U.S. Cl. 29—203 HT **12 Claims**



1. Apparatus for terminating a plurality of insulated conductors in respective insulation-piercing contact portions supported by an electrical connector, said apparatus comprising:

first support means for supporting the electrical connector;

a movably mounted first cutter member for disposition adjacent and parallel to the supported connector;

second support means for supporting the conductors adjacent respective contact portions and to extend across said first cutter member;

a movably mounted second cutter member cooperable with said first cutter member to cut the conductors at a predetermined distance from the respective insulation-piercing contact portions; and

a movably mounted insertion tool including a plurality of insertion blades aligned with the contact portions for engaging and pressing the conductors into the insulation-piercing contact portions.

3,997,956

WIRE INSERTION APPARATUS

William H. McKee, West Covina, Calif., assignor to TRW Inc., Elk Grove Village, Ill.

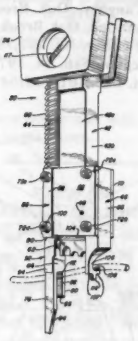
Filed Aug. 30, 1974, Ser. No. 502,086

Int. Cl.² H01R *43/04*

U.S. Cl. 29—203 MW **33 Claims**

1. Apparatus for effecting solderless termination of an insulated electrical conductor wire in a connector including an elongated trough-shaped terminal including a rear wall and opposed side walls and having an open side opposite such rear wall and means in said trough-shaped terminal and adjacent such rear wall for rupturing the insulation of an insulated wire forced thereagainst through said open side and effecting electrically conductive contact with the conductor thereof, comprising insertion means for inserting a wire into such terminal through such open side, said insertion means comprising a ram including an end portion of a thickness and configuration to enter such trough-shaped terminal through such open side, said end portion terminating in an end surface for contacting and applying force to a portion of such a wire in a direction perpendicular to the longitudinal axis of such wire, said ram end portion being movable into such terminal to a position in which said end surface applying force to such a wire is generally parallel to such rear wall and spaced therefrom a distance less than the normal diameter of such a wire, and driving means operatively connected with said ram for driving said

ram end portion and such a wire in contact with such end surface laterally into such terminal to such a position for



compressing said wire against such rear wall, thereby ensuring conductive engagement with such electrical contact means.

3,997,957

DEVICE FOR REPLACING PACKINGS OF FLANGE JOINTS

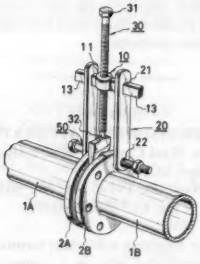
Hisashi Tone, Kosugimachi, and Tadao Chujyo, Takaoka, both of Japan, assignors to Hokko Co., Ltd., Japan

Filed July 24, 1975, Ser. No. 598,632

Claims priority, application Japan, Aug. 14, 1974, 49-96998[U]

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—239 2 Claims



1. A device for replacing the packings of flange joints, said device comprising:

a supporting body formed with a sleeve and a pair of elongated bars extending outwardly in opposite directions from said sleeve;

an elongated movable member extending through said sleeve and being longitudinally movable therein;

a wedge member having a wedge-shaped end adapted to be inserted between the two flanges of said flange joints for purposes of spreading such flanges, said wedge being formed with a pin longitudinally projecting from the end of said wedge member opposite said wedge-shaped end, said pin being formed with an annular groove thereabout;

means for rotatably connecting said wedge member to one end of said movable member, said connecting means comprising:

opposed fork members formed on said one end of said movable member, each fork member being formed with inwardly extending projections at their distal ends;

a snap ring in said groove in said pin, said pin being formed with a first rounded depression in the top end thereof, said movable member being formed with a similar second rounded depression in said one end juxtaposed with said first rounded depression; and

a thrust ball seated in said first and second rounded depressions, said inwardly extending projections engaging and holding said snap ring thereby rotatably coupling said movable member and said wedge member, the thrust of said movable member being transmitted to said wedge member through said thrust ball;

a pair of supporting arms slidably mounted at their upper ends on a respective one of said elongated bars, each of said bars having holes through their lower ends; and

a long bolt extending through said holes in said lower ends of said supporting arms, said long bolt being adapted to extend through bolt holes through one of said flange joints, said lower ends of said supporting bars being adapted to be positioned on either side of said flange joint.

3,997,958

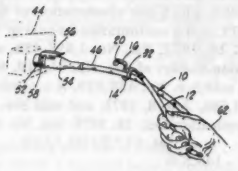
SPEEDOMETER CABLE HOUSING RELEASE AND REMOVAL TOOL

Joe E. Payne, 7208 NW. 44th, Bethany, Okla. 73008

Filed Feb. 9, 1976, Ser. No. 656,335

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—239 20 Claims



1. A speedometer cable housing release and removal tool used to release and remove a speedometer cable housing attached to a speedometer head, the tool comprising:

a handle having a first end;

a fulcrum-guide member connected to the first end of the handle, the fulcrum-guide member having a cable housing receiving groove;

a depressing arm member connected to the fulcrum-guide member; and

a depressing tab member connected to the depressing arm member and disposed thereby in predetermined spatial relation to the first end of the handle, the fulcrum-guide member being positionable to receive the cable housing in slidable relationship in the cable housing receiving groove whereby the depressing tab member is selectively positionable to release the cable housing from the speedometer head.

3,997,959

APPARATUS FOR RELEASING TILT-UP PANEL HOISTING

James E. Case, 943 Glen Meadow Drive, and Richard L. Ruppert, 439 Steffanie, both of Sparks, Nev. 89431

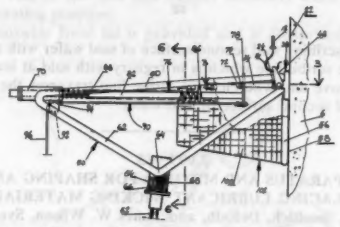
Filed May 19, 1975, Ser. No. 578,552

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—244 13 Claims

1. Apparatus for removing a lifting device attached to an upright tilt-up building panel at a point above the reach of workmen with a split bolt defined by a plurality of segments

and spreading means disposed between the segments for radially spreading the segments into engagement with the insert, the spreading means being axially withdrawable from between the segments to permit the collapse of the segments and their withdrawal from the insert, the apparatus comprising a support structure and means permitting a workman positioned on the ground adjacent the panel to raise the support structure to the height of the insert, a release member formed to engage



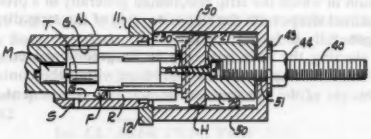
the spreading means, means linearly reciprocably mounting the release member to the support structure and permitting movement of the release member in a direction away from the panel over a sufficient distance to fully withdraw the spreading means from between the segments so that the latter can be collapsed, and actuating means coupled to the spreading means and manually reachable by a workman on the ground for moving the release member away from the panel when the release member engages the spreading means.

3,997,960

AUTOMOBILE LOCK REMOVAL TOOL

David L. Kenyon, 1727 W. Royalton Road, Broadview Heights, Ohio 44147

Filed Feb. 19, 1976, Ser. No. 659,529
Int. Cl.² B23P *19/04*
U.S. Cl. 29—263 **8 Claims**



1. A tool for removal of a lock from a lock enclosure, the lock having a keyway, which tool comprises:

an inner cylindrical core having a central axial bore extending inwardly from its rearward end and having a smaller coaxial hole extending inwardly from its forward end;

means for securing the core to the lock, said securing means having a self-tapping screw member which is mounted through the forward hole in the core and extends from the core for insertion into the keyway;

an outer hollow cylindrical housing which fits over the core and the securing means and which has a forward bearing surface; and

means for retracting the core into the hollow housing interior, whereby the lock secured to the core is removed.

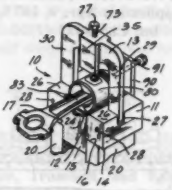
3,997,961

PORTABLE PRESS DEVICE

John A. Sandrick, 2231 W. Chicago Ave., Chicago, Ill. 60622

Filed Sept. 11, 1975, Ser. No. 612,305
Int. Cl.² B23P *19/04*
U.S. Cl. 29—256 **9 Claims**

1. A press device for removing wrist pins from a piston comprising: a base member having a channel in a top surface thereof and a base bore extending therethrough from a channel bottom, a removable sleeve member having a bottom surface dimensioned to be closely received in the channel and a top surface dimensioned to closely receive a piston head with a sleeve bore extending between the sleeve top and bottom surfaces alignable with the base bore, a ram member



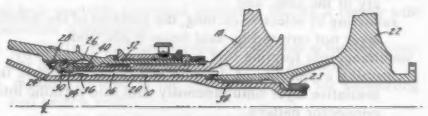
movably attached to a support means carried by the base, the support means spaced from the channel providing an open area above a sleeve received in the channel for receipt of a piston head in the sleeve, the ram member aligned with the base and sleeve bores and movable from a position spaced from the channel towards the channel, and means maintaining alignment of the ram member during movement towards the channel.

3,997,962

METHOD AND TOOL FOR REMOVING TURBINE FROM GAS TURBINE TWIN SPOOL ENGINE

Kenneth S. Kleitz, Rocky Hill, and Loren H. White, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed June 6, 1975, Ser. No. 584,547
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 **8 Claims**



5. Retractable tool means for removing the high turbine of a gas turbine power plant having a high pressure compressor and turbine interconnected by a high shaft, a low pressure compressor and turbine interconnected by a low shaft coaxially mounted relative to said high shaft, coupling means for connecting the low turbine to the low shaft, and additional coupling means including a coupling nut internal of said high shaft, said coupling nut having internal splines, said low shaft having external splines disposed in proximity to but axially spaced from said internal splines, said retractable tool means fitted in an annular groove formed between said high and low shafts, and said retractable tool means having internal and external splines engaging said internal splines and said external splines, whereby the rotation of said low shaft decouples said high turbine.

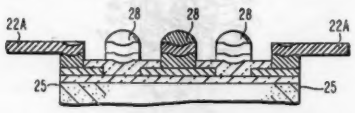
7. The method of removing a high turbine from its shaft from a twin spool gas turbine engine having coaxial low and high shafts supporting a low turbine and compressor and a high turbine and compressor where the low turbine is ahead thereof so as to prevent access to said high turbine, and where said high turbine is secured to the high shaft by an internal nut mounted in an annular groove formed between said high and low coaxially mounted shafts, comprising the steps of removing the low turbine, inserting a tool engaging the low shaft and the internal nut and rotating the low shaft whereby the internal nut is decoupled and permits the high turbine to be removed.

3,997,963

NOVEL BEAM-LEAD INTEGRATED CIRCUIT STRUCTURE AND METHOD FOR MAKING THE SAME INCLUDING AUTOMATIC REGISTRATION OF BEAM-LEADS WITH CORRESPONDING DIELECTRIC SUBSTRATE LEADS

Jacob Riseman, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 375,296, June 29, 1973, Pat. No. 3,893,156. This application Apr. 9, 1975, Ser. No. 566,570
Int. Cl.² B01J 17/00
U.S. Cl. 29—578 5 Claims



1. A method for forming a beam-lead integrated circuit chip structure with solder mound contacts comprising:

forming the beam lead structure by:

forming a first layer of electrically insulative material over a semiconductor chip substrate having a surface from which the active and passive devices in the circuit extend into the substrate,

forming a metallic interconnector pattern on said layer in a first plane which is selectively connected to said devices by contacts extending through said layer,

forming a second layer of electrically insulative material over said interconnector pattern,

forming a plurality of chip contacts extending through said second layer into contact with said interconnector pattern,

forming a metallic layer over said second insulative layer,

forming a plurality of beam-leads of a different metal on said metallic layer respectively in contact with said peripheral contacts and extending beyond the periphery of the chip, and

removing by selective etching, the portions of the metallic layer not covered by said beam-leads, and

simultaneously forming said solder mound contacts by:

forming a plurality of discrete metal lands on said first insulative layer simultaneously with said metallic interconnector pattern,

forming a plurality of mound contacts simultaneously with said chip contacts extending through said second insulative layer to respectively contact said plurality of discrete lands,

forming a plurality of discrete protective lands on said mound contacts of the same metal as said beam leads simultaneously with said beam-leads, whereby the chip contacts are protected during said selective etching step, and

selectively depositing a plurality of solder mounds respectively on said protective lands.

3,997,964

PREMATURE BREAKAGE RESISTANT SEMICONDUCTOR WAFER AND METHOD FOR THE MANUFACTURE THEREOF

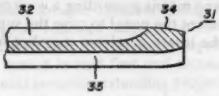
George F. Holbrook, Camillus; Bernard R. Tuft, Scipio Center, and Earl C. Williams, Syracuse, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Sept. 30, 1974, Ser. No. 510,354
Int. Cl.² H01L 21/302
U.S. Cl. 29—583 11 Claims

1. A method of subdividing a semiconductor wafer into a plurality of semiconductor pellets, said method comprising the steps of:

providing a semiconductor wafer having a first surface and a second surface;

forming at least one groove in said first surface of said wafer, wherein a portion of said first surface remains ungrooved during the grooving process;



laser scribing said second surface of said wafer with at least one scribe line which is in registry with said at least one groove and wherein said scribe line traverses the entire said second surface of said wafer.

3,997,965

APPARATUS AND METHOD FOR SHAPING AND PLACING LUBRICANT WICKING MATERIAL

Paul R. Smoltich, DeKalb, and James W. Wilson, Sycamore, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed July 8, 1975, Ser. No. 594,123
Int. Cl.² H02K 15/14
U.S. Cl. 29—596 21 Claims

1. In the manufacture of a dynamoelectric machine, a method of forming lubricant wicking material in a device for shaping it and transferring the lubricant wicking material into means for containing it in a component for the dynamoelectric machine, the method comprising the steps of:

a. providing the lubricant wicking material in a generally elongate strip having a predetermined length and a pair of opposite ends and feeding the strip generally lengthwise thereof into the shaping device;

b. advancing the strip in the shaping device toward a position in which the strip is confined generally in a predetermined shape with the opposite ends of the strip disposed generally in facing relation; and

c. ejecting the strip generally in its predetermined shape from the shaping device into place within the containing means of the dynamoelectric machine component.

3,997,966

COMBINATION NAIL CLIPPER, CLIPPING RECEPTACLE AND REMOVABLE FRONT LID

James J. A. Sartore, 128 Morris St., Albany, N.Y. 12208

Filed May 24, 1976, Ser. No. 689,536
Int. Cl.² A45D 29/02
U.S. Cl. 30—28 13 Claims

1. A nail clipper surrounded by a receptacle containing a front lid which can contain waste clippings produced, said nail clipper being generally comprised of upper and lower nail clipper members fastened at one end forming a bifurcated portion, whose opposite end contains front jaws spaced apart formed in opposing relationship to each other, tied together by means of an operating arm rivet and operating arm, said operating arm rivet being placed through aligned openings located near said front jaws controlling the movement of said jaws through said nail clipper members which are fastened at said one end;

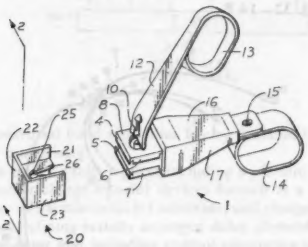
wherein the improvement comprises, a generally tubular nail clipping receptacle portion formed of top, bottom and two side walls in continuous relationship with each other, surrounding that portion of the nail clipper members not containing cutting jaws;

one end of the nail clipper contains a lower formed handle

with the upper and lower nail clipper members diverging out and abutting the respective said top and bottom clipping receptacle walls and having two said clipping receptacle side walls to complete the enclosure;

the nail clipper opposite end containing front, left and right said cutting jaws which are controlled by manipulating both the upper formed handle which is at the end of the operating arm and said lower formed handle which is at the end of the said nail clipper members when in the operating position;

a removable front lid is provided and is comprised of lid



front wall and two lid side walls which when placed over the said nail clipper opposite end surround the said nail clipper cutting jaws and contains a slotted insert and operating arm rivet catch opening to fit between and block the opening formed by the said cutting jaws, said operating arm rivet catch opening as part of the said slotted insert unites with and holds the operating arm rivet which will maintain the said front lid in position, also an operating arm rivet opening works in conjunction with the said slotted insert and said operating arm rivet catch opening to hold the said removable front lid in this position until removal is desired.

3,997,967

DRY SHAVER WITH AN EXTENDIBLE TRIMMER

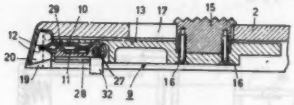
Jan De Boer, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,612

Claims priority, application Netherlands, May 1, 1974, 7405802

Int. Cl.² B26B *19/10*; E05F *1/10*

U.S. Cl. 30—34.1 **5 Claims**



1. In a dry shaver including a housing having an aperture with top, bottom and end parts, a shaving head, a trimmer movable between a retracted position within the housing and an extended position extending partially through said aperture, and an actuating member movable between retracted and extend positions for moving said trimmer between its corresponding positions, the improvement in combination therewith, of means for selectively closing said aperture comprising a flap having top, bottom and end parts corresponding to those of the aperture, an axle at each of said flap ends defining a pivot axis, said housing further including a pair of spaced slots near the ends of said aperture and extending transversely of said pivot axis, each slot having top and bottom parts corresponding to those of said aperture, said axle end-parts situated in said slots, said improvement further comprising spring means in each of said slots urging the axle therein toward the top of said slot, and said flap being movable between closed position with said axles near the tops of the slots and said flap closing said aperture, and open position with said axles moved downward in said slots and said flap pivoted about said axis and thus opening at least a part of said aperture, said flap further comprising a curved cam surface which engages said aperture top part and causes said flap to move downward when said flap is pivoted toward its open position, said flap being pivoted toward its open position by said actuating member when said member is moved toward its extended position.

3,997,968

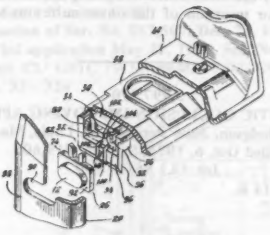
SWITCH ARRANGEMENT FOR HAND-HELD PORTABLE ELECTRICAL APPLIANCES

Peter Alfred Czerner, Trumbull, and Edward Szymansky, Fairfield, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,610

Int. Cl.² B26B *19/02*

U.S. Cl. 30—43.92 **10 Claims**



1. An improved electric switch detent arrangement for a hand-held portable electrical appliance having a casing with an aperture comprising,

a. an electric switch unit having a detentless actuating member for operating the switch in on/off positions,

b. means provided in the appliance casing for supporting said switch unit,

c. a movable detent member within the appliance casing having a portion extending through said casing aperture and supported for movement along a path of travel defined by the casing aperture,

d. means formed on said detent member for operatively engaging said switch actuating member, and

e. resilient means within the appliance casing positioned in said path of travel and deflectable by the movable detent member upon operation thereof for detenting the switch actuating member into either of said on/off positions.

3,997,969

ELECTRIC DRY SHAVER

Peter A. Czerner, Trumbull, and Robert Earl Davis, North Branford, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,611

Int. Cl.² B26B *19/02*

U.S. Cl. 30—43.92 **10 Claims**

1. An electric dry shaver comprising,

a. a shaver casing,

b. a cutter head including an inner and outer cutter disposed on said casing and having upstanding opposed walls,

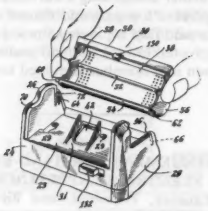
c. said outer cutter supported on said cutter head having opposed end portions adjacent said cutter head walls,

d. said outer cutter being spaced from the casing and defining a hair particle chamber therebetween,

e. pivotal mounting members on said outer cutter opposed

end portions and extending toward the opposed cutter head walls,

f. means on the opposed cutter head walls for pivotally receiving and supporting the outer cutter for rotatable movement to permit exposure of said chamber, and



g. resilient means on the opposed cutter head walls for interlocking the outer cutter mounting members to said receiving and supporting means,

h. said resilient means being deflectable upon forcible contact by the outer cutter mounting members to permit removal or insertion of the outer cutter to said cutter head.

3,997,970

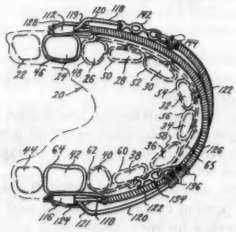
ORTHODONTIC OCCLUSION-IMPROVING APPLIANCE

Edward W. Hodgson, 3006 Pershall, St. Louis, Mo. 63136

Filed Oct. 6, 1975, Ser. No. 619,605

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 R **14 Claims**



1. An orthodontic appliance for applying a repositioning force between teeth of a person's jaws to improve the occlusion of those jaws which comprises an orthodontic arch wire that is securable to one of said jaws, said orthodontic arch wire being located exteriorly one of the outer faces of the teeth of said one jaw and being bowed to generally follow the curvature of said one jaw, a helical extension spring that is telescoped over, and hence is supported and guided by, a portion of the length of said orthodontic arch wire, means to limit movement of one end of said helical extension spring relative to one end of said orthodontic arch wire while permitting the other end of said helical extension spring to move relative to the other end of said orthodontic arch wire, said helical extension spring having an inner diameter which is sufficiently larger than the diameter of said orthodontic arch wire to permit said other end of said helical extension spring to move freely relative to said other end of said orthodontic arch wire even though said orthodontic arch wire is bowed to generally follow the curvature of said one jaw, said other end of said helical extension spring occupying a predetermined position along the length of said orthodontic arch wire whenever said helical extension spring is in its unstressed condition, and a flexible connector which connects said other end of said helical extension spring to the other of said jaws at a point which is displaced along the length of said orthodontic arch wire from said predetermined position which said other end of said helical extension spring occupies whenever said helical extension spring is in its unstressed condition, said flexible connector and said helical extension spring being dimensioned to apply repositioning forces to said teeth and hence to said jaws.

3,997,971

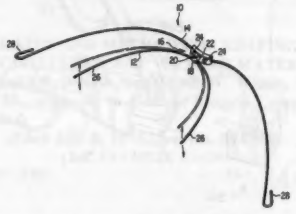
UNIVERSAL ORTHODONTIC HEAD GEAR

Dan Moss, 247 Ridge Road, Cedar City, Utah 84720

Filed July 28, 1975, Ser. No. 599,714

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 B **5 Claims**



1. An orthodontic head gear comprising:

a. an arch bow which is adapted to conform to the contour of a dental arch of a patient undergoing orthodontic treatment;

b. a face bow which is adapted to be positioned outside of the patient's mouth from a position in front of the mouth to a position to the rear thereof; and

c. a rotatable coupling coupled to said arch bow and to said face bow, said coupling being rotatable in two orthogonal directions and being selectively positionable at a point which lies within a plane bisecting the arch bow into symetric parts and at a plurality of points outside of the plane.

3,997,972

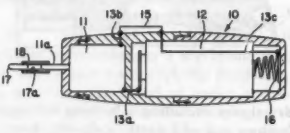
WRITING DEVICE EMPLOYING WRITING TIP MOUNTED ON FLEXIBLE ROTATING SHAFT

Janis V. Jaunarajs, 56 W. Cliff St., Somerville, N.J. 08876

Continuation-in-part of Ser. No. 391,500, Aug. 24, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 550,970

Int. Cl.² B43K *29/00, 19/00;* **B43L** *9/00, 13/00*

U.S. Cl. 33—18 R **3 Claims**



1. A writing device comprising:

a handle,

a shaft, extending beyond the handle and rotatably mounted on the handle,

means for imparting rotary motion to the shaft,

a writing tip, and

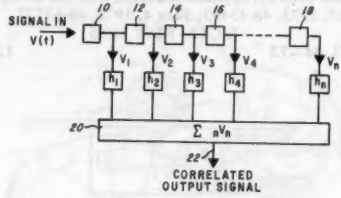
a rubbery connector releasably connecting the writing tip to the shaft, which rubbery connector comprises a section of surgical rubber tubing, one end of which is fitted to the shaft and the other end of which is fitted to the base of the writing tip.

3,997,973

TRANSVERSAL FREQUENCY FILTER

Dennis Darcy Buss, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 257,252, May 26, 1972, abandoned.
This application Nov. 13, 1974, Ser. No. 523,591
Int. Cl.² H03H 7/10, 7/12, 7/28; H01L 29/78
U.S. Cl. 333—70 T 9 Claims



1. A transversal band pass filter having variable band pass frequency comprising:

a charge-transfer shift register including a plurality of semiconductor charge-transfer devices formed at a common surface of a semiconductor substrate, said charge-transfer devices defining serially arranged delay elements of said shift register and including control electrodes separated from said semiconductor substrate by an insulating layer; variable frequency clock source means for applying clock signals selectively to said control electrodes to effect storage of said input signals in said delay elements in the form of electrical charge and to effect shift register transfer of said stored charges between delay elements of said shift register at a preselected rate corresponding to a desired band pass center frequency for said filter defined by a preselected frequency of said clock source such that said band pass center frequency can be selectively varied by changing the frequency of said clock source means; circuit means coupled to respective delay elements of said shift register for detecting the amplitude of a charge stored therein to produce a detected signal and for selectively weighting the amplitude of said detected signal, said circuit means including a high impedance detector comprising a first insulated gate field effect transistor having source, drain and gate, means coupling said gate to a node of said shift register to provide a high impedance tap, means connecting said first field effect transistor and a second insulated gate field effect transistor to form a source follower amplifier, said second field effect transistor including a source providing an output signal from said source follower amplifier weighted dependent on the impedance of said second field effect transistor.

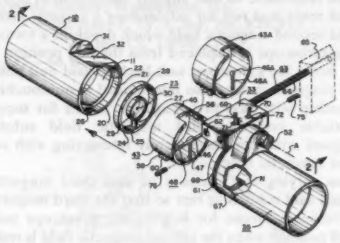
3,997,974

ARCHERY BOW SIGHTING MECHANISM

Marlow W. Larson, 2735 S. 4050 West, Ogden, Utah 84401

Filed Jan. 19, 1976, Ser. No. 650,412
Int. Cl.² F41G 1/46, 1/42, 1/38
U.S. Cl. 33—265 13 Claims

1. Sighting structure including, in combination, elongate tubular enclosure structure, a front sight disposed forwardly in said enclosure structure and comprising a lens having a central sighting marking disposed thereon, said lens being annularly spaced from said enclosure structure by an essentially annular open viewing space, a rear sight rearwardly spaced with respect to said front sight and also positioning in said enclosure



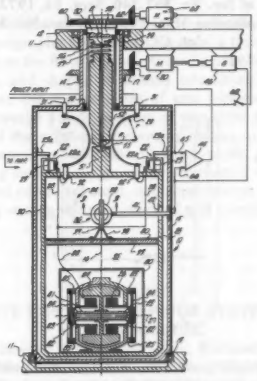
structure, said rear sight comprising a reticle alignable with said front sight.

3,997,975

CALIBRATION OF A MERIDIAN SEEKING INSTRUMENT

Ralph E. Knapp, Canoga Park, Calif., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Continuation of Ser. No. 887,507, Dec. 23, 1969, abandoned.
This application May 22, 1972, Ser. No. 255,563
Int. Cl.² G01C 19/38; B64C 17/02; G05B 17/00
U.S. Cl. 33—324 13 Claims



1. A calibration system for eliminating the effects of static error which move a pendulously supported two-degree-of-freedom meridan seeking gyroscope from a predetermined null position relative to a gyroscope container, the instrument including a gyroscope unit having a rotor adapted for rotation about a horizontal spin axis that tends to align itself with the meridian when the unit is pendulously supported for two degree freedom of movement by a suspension band and further including means rotatably mounting the container on a frame for rotation about a vertical axis, which container surrounds the suspended gyroscope unit and also includes a pick-off for generating an electrical signal which is representative of an angular displacement relative to said null position between the gyroscope unit and the container, said calibration system comprising:

first magnetic means fixed to gyroscope unit for supplying a first reference magnetic field perpendicular to the vertical axis;

second magnetic means fixed to the container and interspaced in non-touching relationship from the first magnetic means for supplying a second magnetic field perpendicular to the vertical axis and inductively coupled in

substantially perpendicular direction with the first reference magnetic field when there is no angular displacement of the gyroscope unit away from said null position;

means responsive to said angular displacement signal when said rotor is at rest for establishing a variable intensity in said second magnetic field which develops a torque when the gyroscope is displaced from the null position tending to move the gyroscope unit back to said null position;

third magnetic means also interspaced in nontouching relationship with said first magnetic means for supplying a variable intensity third magnetic field substantially aligned with and magnetically interacting with said second magnetic field;

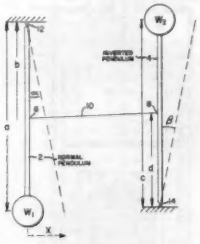
means varying the intensity of said third magnetic field when said rotor is at rest so that the third magnetic field develops a torque for holding the gyroscope unit at its null position when the second magnetic field is reduced to zero; and

means responsive to said angular displacement signal when said rotor is spinning for establishing a damping torque magnetic field in said second magnetic means as the spin axis of the rotor seeks out the meridian.

3,997,976
SENSITIVE TILTMETER

Yao T. Li, Lincoln, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 397,340, Sept. 14, 1973, abandoned. This application Mar. 19, 1975, Ser. No. 559,988
Int. Cl.² G01C 9/16
U.S. Cl. 33—391 **4 Claims**

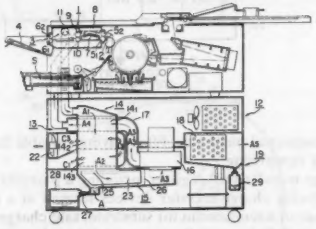


1. A composite pendulum structure comprising a normal pendulum, an inverted pendulum, the length of said pendulums being at least approximately equal, a connecting member connecting a first point on said normal pendulum with a second point on said inverted pendulum, the distance from the pivot point of said normal pendulum to the first point being approximately but not exactly the equal to the distance from the pivot point of the inverted pendulum to the second connecting point, whereby the effective pendulum length of the composite pendulum structure is very much longer than the length of either pendulum, said pendulums being pivoted upon suspension systems comprising a first cylindrical bar, a second cylindrical bar, means to hold said first bar stationary with respect to a reference member, a first ribbon partially wrapped around said stationary bar, passing around said supported bar, and returning to partially pass around said stationary bar, a second ribbon member, said second ribbon passing partially around said stationary bar, said second ribbon then passing around said second bar, said second ribbon then passing partially around said stationary bar, the ends of said first and second ribbons being affixed to said stationary bar, whereby said ribbons constrain said second bar to substantially frictional-free rotational movement but offer high resistance to any other movement of said moveable bar.

3,997,977
DEVELOPING LIQUID RECOVERY DEVICE IN A COPYING MACHINE

Hajime Katayama; Koichi Miyamoto, both of Tokyo, and Shoji Ohashi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 426,054, Dec. 19, 1973, Pat. No. 3,890,721. This application Jan. 6, 1975, Ser. No. 539,230
Claims priority, application Japan, Dec. 26, 1972, 48-994; Apr. 17, 1973, 48-43493; June 4, 1973, 48-62737
Int. Cl.² F26B 21/06
U.S. Cl. 34—73 **12 Claims**



1. A developing liquid recovery device comprising:

a drying chamber which includes an inlet and an outlet for a copy medium and which is of substantially hermetically sealed construction, said drying chamber accommodating heating means for heating the copy medium bearing an image formed with a liquid developer to dry the copy medium, wherein a developing liquid vapor is produced from the copy medium;

a condenser chamber having a passage interconnecting said drying chamber therewith, wherein said condenser chamber is for accommodating means for cooling and liquefying the developing liquid vapor produced in said drying chamber;

means for circulating an air flow from said drying chamber through said passage to said condenser chamber and back to said drying chamber;

discharging means disposed downstream of said condenser chamber and upstream of said drying chamber with respect to said circulating air flow, said discharging means discharging a part of the air flow to maintain the pressure in said drying chamber at a lower value than that of the ambient pressure; and

a separating container disposed with respect to said condenser chamber for receiving the developing liquid which has been liquefied by said cooling and liquefying means, said separating container including first discharging means for discharging a part of the liquefied developer of relatively high specific gravity and second discharging means for discharging a part of the liquefied developer of relatively low specific gravity.

3,997,978
ROPE CONDITIONING APPARATUS

Alfred R. Stuckey, P.O. Box 386, Astatula, Fla. 32703

Filed Sept. 8, 1975, Ser. No. 611,189
Int. Cl.² F26B 25/00
U.S. Cl. 34—104 **5 Claims**

1. An apparatus for conditioning and storing a flexible coiled rope comprising in combination:

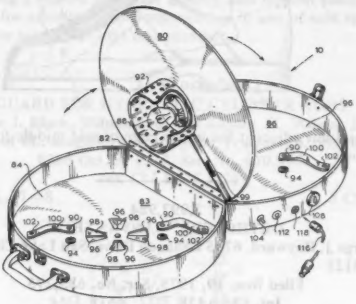
a cover having a chamber therein for receiving a coiled rope to be conditioned;

a base having a chamber therein for receiving a coiled rope for storage, said cover being movable attached to said base;

plate means movably attached between said base and said cover for separating said chambers therein;

heating means for heating a coiled rope within said chamber of said cover, said heating plate means being centrally located on said separating means so as to be inside a coil of a rope;

means for protecting said coiled rope from contacting said heating means, said protecting means surrounding said



heating means and having a plurality of bores therein for allowing the circulation of air therethrough; and

said cover having a plurality of bores therethrough, said bores being adjacent to said heating means for removing a portion of the heat and moisture from said chamber of said cover, whereby the temperature and moisture content of said coiled rope may be conditioned.

3,997,979

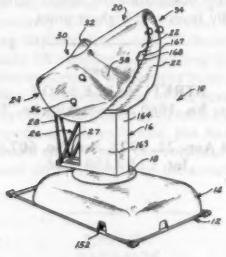
RODEO TRAINING DEVICE

Joe D. Turner, S. S. Box 157, Corrales, N. Mex. 87048

Filed Feb. 12, 1975, Ser. No. 549,277

Int. Cl.² A63K 3/00

U.S. Cl. 35—29 R 11 Claims



1. A rodeo training device comprising, in combination

a base;

a rider support;

motor driven means supported by said base for imparting an up and down motion to the rider support to simulate a bucking action of a rodeo animal attempting to unseat its rider; and motor driven means supported by said base for spinning said rider support at a speed to simulate the spinning action of a rodeo animal attempting to unseat its rider.

3,997,980

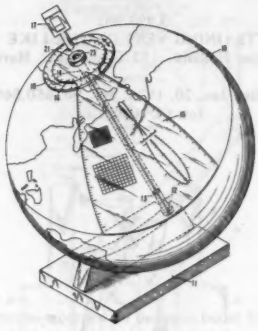
GLOBE AND MEASURING DEVICE

Richard K. Rogers, Falls Church, Va., assignor to National Geographic Society, Washington, D.C.

Filed Nov. 5, 1975, Ser. No. 628,911

Int. Cl.² G09B 27/08

U.S. Cl. 35—46 R 5 Claims



1. A combination globe and measuring device comprising, a globe with geographical markings thereon, a transparent overlay assembly in the form of a substantially pie-shaped segment of the globe and shaped to closely interfit and overlay the globe surface, the wedge point of said pie-shaped segment adapted to overlie a pole position of the globe to comprise a pole point of the segment, measuring indicia on said overlay including respective different distance scale markings imprinted along each side edge of the pie-shaped segment from the pole point of the segment, and pivot means to removably and pivotally secure the pole point of said overlay segment to said globe.

3,997,981

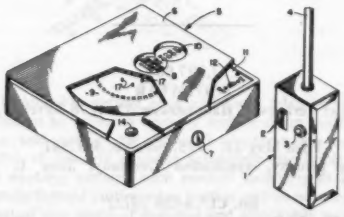
REMOTE CONTROL RESPONSE SYSTEM FOR CLASSROOM USE

Michael Tradowsky, 10370 Blair Lane, Kirtland, Ohio 44194

Filed June 16, 1975, Ser. No. 587,262

Int. Cl.² G09B 7/02

U.S. Cl. 35—48 R 2 Claims



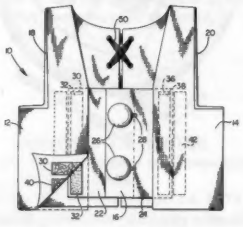
1. A remote control response system for student testing and the like in conjunction with visual-audio materials and an instructor-controlled transmitter means comprising a unit for each student having an answer sheet therein successively indexed for recording of answers to questions on successive exposed areas of said sheet; drive means in said unit operative to so index said answer sheet; said drive means including a

signal receiver means operative by a signal emitted from said instructor-controlled transmitter means to effect operation of said drive means to successively index said answer sheet each time that said receiver means receives a signal from said transmitter means; said drive means comprising a spring motor in each unit having an escapement mechanism actuated by said receiver means.

3,997,982
TRAINING VEST OR THE LIKE

Esther Stebbins Holland, 112 Beacon St., Hartford, Conn. 06105

Filed Jan. 20, 1976, Ser. No. 650,869
Int. Cl.² G09B *1/00*
U.S. Cl. 35—56 **10 Claims**



1. A training aid resembling a garment for teaching children and handicapped persons manipulative skills in dressing comprising:

a first panel and an associated second panel which are situated respectively over different body portions when the training aid is worn on the body;

a replaceable practice panel for positioning intermediate the first and second panels and comprised of two separable sections situated in side-by-side relationship between the first and second panels when the training aid is worn on the body and complementary fastening means on the sections for connecting the two sections together in said side-by-side relationship in a practice exercise;

first releasable attachment means interposed between the first panel and one of the two sections of the practice panel for holding the first panel and the one section of the practice panel together; and

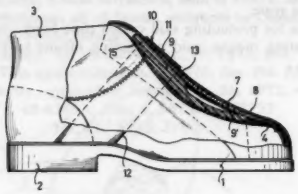
second releasable attachment means interposed between the second panel and other of the two sections of the practice panel for holding the second panel and the other section of the practice panel together.

3,997,983
FOOTWEAR

Franz-Josef Terhoeven, Hauptstrasse 32, 4178 Kevelaer, Germany

Filed May 28, 1975, Ser. No. 581,581
Claims priority, application Germany, June 1, 1974, 2426727
Int. Cl.² A43B *13/22*
U.S. Cl. 36—72 R **10 Claims**

1. A shoe having a sole for receiving the wearer's foot, said sole having an upper portion mounted thereon which encloses the forward area of the wearer's foot; a stiff middle foot protector inserted into, and covered by, said upper portion and positionable above the wearer's foot, said protector having an upper edge; a resilient lining supporting said edge of the middle foot protector; and a fastening means for the shoe anchored in at least one of said sole and upper portion, said fastening means compressively embracing said upper portion

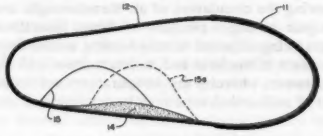


beyond but adjacent the upper edge of said middle foot protector.

3,997,984
ORTHOPEDIC CANVAS SHOE

George J. Hayward, 6285 Granada Drive, Salt Lake City, Utah 84121

Filed Nov. 19, 1975, Ser. No. 633,275
Int. Cl.² A43B *7/22;* **A61F** *5/14*
U.S. Cl. 36—91 **6 Claims**



1. An orthopedic flexible soled canvas shoe comprising:

a. a canvas upper portion,

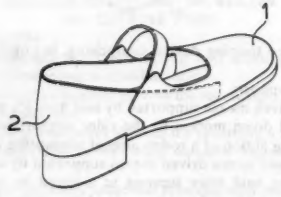
b. a flexible sole fixedly attached to said canvas portion, and sole having a medial wedge forming part of the lower surface in the heel portion thereof which gradually slopes laterally and forwardly to become integral with the normal sole surface, said sole curving upwardly in the area of the plantar arch, terminating such that the medial side of the sole forms essentially a straight line extending from the heel of the shoe to the portion of the shoe adapted to accommodate the medial side of the ball of the foot, and

c. an arch support positioned such that the highest portion of the support is located beneath the navicular bone of the foot, said support extending along the plantar arch and gradually descending in height both laterally and longitudinally from said highest point.

3,997,985
STRETCHABLE SHOE

Atsuyoshi Shiina, No. 1060 Shimosakunobe, Takatsu, Kawasaki, Japan

Filed Aug. 22, 1975, Ser. No. 607,054
Int. Cl.² A43B *3/26*
U.S. Cl. 36—97 **8 Claims**



1. A longitudinally stretchable shoe, comprising a rear

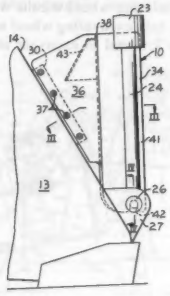
member having a sole and a heel; at least one front member; means for guiding said front member on said rear member for displacement longitudinally of the shoe between a plurality of spaced positions to thereby select a longitudinal dimension of the shoe, said guiding means including a middle plate and a bottom plate on said front member together bounding a first space for guiding said sole, and two portions of said heel bounding a second space for guiding said bottom plate; and means for arresting said front member in any of said spaced positions relative to said rear member.

3,997,986

GUARD FOR HYDRAULIC CYLINDER RODS

William J. Black, Wilmington, and Eugene M. Wilson, Joliet, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 9, 1975, Ser. No. 620,997
Int. Cl.² E02F *9/24*
U.S. Cl. 37—8 **3 Claims**



1. In a self-loading scraper of the type having a scraper bowl open at its forward end and including a pair of sidewalls each having an upwardly rearwardly sloping leading edge, an elevator mechanism disposed at the open end of the scraper bowl and between the leading edges, a draft apparatus having a pair of rearwardly extending draft arms with the distal ends of the draft arms individually pivotally attached to the sidewalls, a pair of hydraulic lift cylinders pivotally connected to the draft apparatus and having their rods pivotally connected to the lower forward corners of the sidewalls, wherein the improvement comprises:

a guard removably secured to the lower forward corner of one of the sidewalls at the leading edge thereof and extending inwardly toward the elevator mechanism, said guard being disposed rearwardly of the rod of the respective hydraulic lift cylinder for shielding the rod from loose noncohesive material in the scraper bowl and for aiding in the retention of such material in the scraper bowl; and

a pin pivotally connecting the rod of each hydraulic cylinder to the respective sidewall, said pin having an annular groove formed in one end thereof, said guard having a notch formed therein fitted into the annular groove of the pin.

3,997,987

BACKHOE

Audie B. Tomlinson, Rte. 1, Box 215, Cove, Oreg. 97824

Filed June 20, 1975, Ser. No. 588,703
Int. Cl.² E02F *5/02*
U.S. Cl. 37—103 **15 Claims**

1. In a backhoe,

a somewhat horizontal main boom having a vertical journaling bore,

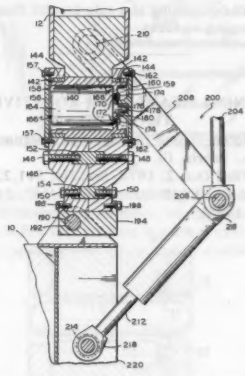
a short shaft having longitudinal hydraulic passages therethrough,

bearing means journaling the shaft in the journaling bore,

the shaft having upper ports above the journaling bore and lower ports below the journaling bore,

a jib boom aligned with and rigidly attached at its upper end to the shaft,

bucket means mounted on the lower end of the jib boom,



indexing means mounted on the main boom for rotating the shaft in the journaling bore,

rotary coupling means connected to the upper ports,

hydraulic drive means mounted on the jib boom,

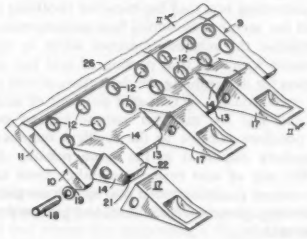
and hydraulic lines extending along the jib boom and connecting the lower ports to the drive means.

3,997,988

ONE-PIECE REPLACEABLE CUTTING EDGE AND TOOTH ADAPTER WITH TOOTH

Gene R. Klett, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 406,815, Oct. 16, 1973, abandoned. This application Sept. 2, 1975, Ser. No. 609,873
Int. Cl.² E02F *9/28;* **172** *699;713;762*
U.S. Cl. 37—141 R **6 Claims**



1. Detachable cutting edge and tooth adapter means for attachment to an earth working surface of an earth moving device, said cutting edge and tooth adapter means including a plurality of discrete modules separately attachable on said earth working surface, each module including at least one integrally formed cutting edge portion and an adapter portion formed as one piece of material and attachable as a unit to said earth working surface by replaceable fastening means, said adapter portion projecting outwardly beyond and upwardly relative to said cutting edge portion, replaceable tooth means mounted on said adapter portion to project outwardly and upwardly relative to said cutting edge portion, said adapter portion including a flat distally located abutment surface and said tooth means including a corresponding flat

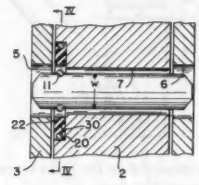
abutment surface disposed in mating engagement with said abutment surface of said adapter portion, said adapter portion including opposed first and second surfaces converging toward said flat abutment surface, and said tooth means including opposed third and fourth surfaces converging towards said flat abutment surface of said tooth means, said third and fourth surfaces converging at a rate greater than said first and second converging surfaces.

3,997,989

TIP RETAINING MEANS WITH ROTATIVE LOCKING TENDENCIES

Visvaldis A. Stepe, Willow Springs, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 2, 1974, Ser. No. 511,232
Int. Cl.² E02F 9/28; F16B 21/07, 21/18
U.S. Cl. 37—142 A 8 Claims



1. A bar member, and a bar member retaining means for releasably securing the position of said bar member comprising;

a resilient member having a bar member receiving opening therethrough, bar member engaging spring means resiliently supported within said resilient member and having opposed portions extending at least partially into said bar member receiving opening, said bar member engaging spring means operatively exerting oppositely directed holding forces upon said bar member, said bar member being elongated and at least partially cylindrically shaped, said bar member having a first portion and having a second grooved portion axially spaced apart from said first portion and having a lesser cross sectional dimension than said first portion, at least the portions of said spring means extending into said bar member receiving opening and said bar member assuming first predetermined positions relative the resilient member when in operative engagement with said first portion of said bar member, and means for determining the deflection of said portions of said spring means so that said portions of said spring means and said bar member assume second predetermined positions relative to the resilient member which are angularly displaced in the same relative direction about the axis of said resilient member from said first predetermined positions when said spring portions are in operative engagement with said second groove portion of said bar member.

3,997,990

ANGULARLY DISPOSED SINGLE WHEEL EXCAVATOR

Charles R. Satterwhite, Dallas, Tex., assignor to Unit Rig & Equipment Co., Tulsa, Okla.

Continuation-in-part of Ser. No. 435,296, Jan. 21, 1976, Pat. No. 3,896,571. This application July 17, 1975, Ser. No. 596,575
Int. Cl.² E02F 3/24
U.S. Cl. 37—189 20 Claims

1. An excavating and loading system comprising in combination:

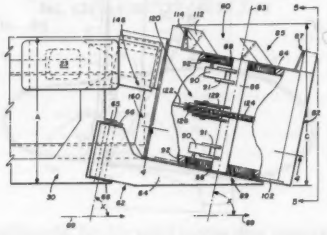
a vehicle including a frame and means supporting the frame of the vehicle for movement over a surface;

excavating wheel means for forming an excavation and including opposed end plates and a plurality of digging buckets extending substantially continuously between the end plates and located immediately adjacent one another to define the entire circumference of the excavating wheel, each digging bucket having a cutting edge which extends to a stationary wall and a wall mounted for pivotal movement from a material receiving position to a material dumping position, said excavating wheel means being wider than the vehicle;

supporting and housing means on the vehicle supporting from the frame and supporting said excavating wheel means cantilever in the front of the vehicle for rotation about an axis extending at an acute angle with respect to the direction of travel of the system, the supporting and housing means engaging the excavating wheel means adjacent one of the end plates thereof;

a plurality of digging teeth mounted on the opposite end plate of the excavating wheel means;

means for selectively varying the relative vertical positioning of said excavating wheel means with respect to said frame whereby said excavating wheel means can be selectively raised or lowered to excavate at various depths;



drive means for rotating the excavating wheel means so that the digging buckets follow a circular path;

said one end plate and said opposite end plate of the excavating wheel means therefore defining circular paths including a forward portion and a rearward portion, respectively, positioned farther apart than the maximum width of the remainder of the excavating and loading system whereby the system is adapted to travel in its own excavation;

means located within the margins of the excavating wheel means and responsive to rotation thereof for positively positioning the movable wall of each digging bucket in the material dumping position when the bucket is in the upper and rearward portion of the path; and

conveyor means mounted on the vehicle entirely behind the excavating wheel means for movement around a course including a relatively low portion positioned to receive material from the digging buckets of the excavating wheel means and a relatively high material dumping portion located rearwardly on the vehicle.

3,997,991

DISPLAY DEVICE

Charles R. Hayman-Chaffey, 123 W. 74th St. Apt. 10B, New York, N.Y. 10023, and Frederick W. Hayman-Chaffey, 239 Central Park West Apt. 12C, New York, N.Y. 10024

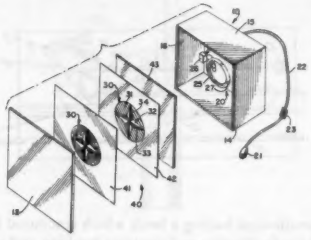
Continuation of Ser. No. 433,900, Jan. 16, 1974, abandoned. This application July 18, 1975, Ser. No. 597,213
Int. Cl.² G09F 13/04
U.S. Cl. 40—135 5 Claims

1. A display device capable of converting an apparent black and white image into an apparent at least partially colored image when visible light is passed through said image, comprising:

a first sheet of a translucent material capable of passing visible light therethrough, said first sheet containing a

first image which appears by reflected light from an observation point forward of said first sheet as a black and white image in the absence of visible light passing through said first image;

a second sheet of translucent material capable of passing visible light therethrough, said second sheet containing a second image which is not apparent at said observation point by reflected light in the absence of visible light passing through said second image which includes at least a portion which is the duplicate portion of said first image, said second image being positioned immediately adjacent to said first sheet without an intervening sheet therebetween so that the duplicate portion of said first image included in said second image is in register with the corresponding portion of said first image on said first sheet and wherein said first sheet and said second sheet are laminated or adhesively secured with transparent adhesive one to the other to form a sharp clear image when lighted and wherein said first sheet is a translucent sheet having photographic properties and wherein said



second sheet is a translucent sheet having photographic properties, each adapted to have colored images applied thereto, wherein, said second sheet is a combination of photographically negative and photographically positive portions, the portion of the image on said second sheet which is in register with said first sheet being the photographic inverse of the image on said first sheet;

a source of visible light within said housing and at a rear portion thereof which is capable of passing visible light through both said first sheet and said second sheet;

a housing supporting said first and said second sheets at a front portion thereof and said light source at a rear portion thereof to project said visible light through said sheets, said housing further comprising a plurality of walls, said front wall being transparent, said first sheet being located adjacent said front wall;

whereupon, upon the passage of visible light through said first sheet and said second sheet, the optical combination of the second image on said second sheet including said partially colored portion and said first image on said first sheet is apparent at said observation point.

3,997,992

FILM RECORD CARD

Thomas P. Anderson, Hubbard Woods, Ill., assignor to Microseal Corporation, Zion, Ill.

Filed Mar. 29, 1974, Ser. No. 456,153

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² G09F 1/10

U.S. Cl. 40—159 **2 Claims**

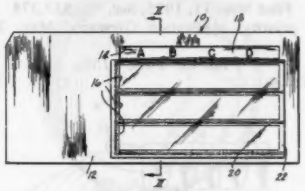
1. A microfilm record card comprising:

a card stock having a plurality of apertures formed therein,

a first transparent enveloping member secured to one face of said card stock and underlying all of said apertures,

a translucent semi-opaque ink receptive coating carried directly on at least one portion of said enveloping member and disposed within the area defined by at least one of said apertures to accommodate the reception of inked indicia, and

a second transparent enveloping member overlying all of said apertures but for those exposing said translucent



semi-opaque ink receptive coating carried on said first mentioned enveloping member, whereby said enveloping members define film pockets at each of said apertures but for those exposing said ink receptive coating.

3,997,993

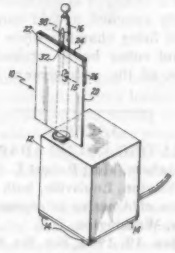
FLAG WAVING UNIT

Edward J. Flaherty, 5219 Lake Arrowhead Drive, Waco, Tex. 76710

Filed July 2, 1975, Ser. No. 592,543

Int. Cl.² G09F 17/00

U.S. Cl. 40—218 **4 Claims**



1. A flag waving device comprising:

a. a substantially vertical staff having an upper and a lower end and means for supporting a flag at the upper end of said staff;

b. a clip having a central arm, said flag being attached to said clip;

c. said support means comprises rotatable hinge means securing said clip to said staff for preventing wrinkling of said flag when the device is not in use, whereby said flag is selectively positionable in either an inoperable position wherein said central arm is substantially horizontal and said flag hangs in a downward direction therefrom, or in an operable position wherein said central arm is substantially vertical and said flag waves outward therefrom; and,

d. an elongated flat section formed in said staff at said upper end, said flat section located in registry and co-extensive with said central arm when in said operative position, whereby said flag is rigidly secured in said operative position.

3,997,994

SHOULDER ARM WITH SWIVEL BREECH MEMBER

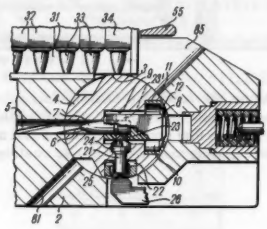
Günter Kästner; Dieter Ketterer; Tilo Möller, all of Oberndof, and Ernst Wössner, Sulz-Muhlheim, all of Germany, assignors to Heckler & Koch GmbH, Oberndorf, Germany

Filed Mar. 11, 1975, Ser. No. 557,375

Claims priority, application Germany, Mar. 21, 1974, 2413615

Int. Cl.² F41C *11/00*

U.S. Cl. 42—9 19 Claims



1. A shoulder arm having a rigidly attached barrel and capable of firing a cartridge having a primer, especially a rifle, the shoulder arm having a breech member which can be swivelled about an axis which is perpendicular to the axis of the barrel for loading and which contains a firing chamber which is in alignment with said barrel in its firing position in which it is fully closed to the rear, further having a firing pin which upon triggering hits the primer of the cartridge to be fired by the fire arm, further having an arrangement for swivelling said breech member out of said firing position and into a loading position, in which said firing chamber is accessible for the introduction of the cartridge, in which said breech member is designed as a roller which can be swivelled about its longitudinal axis and which is arranged in a cylindrical hole in a member which is fixedly attached to said barrel and whose wall directly closes said firing chamber when it is located in the firing position, said roller being retained in its respective position by means of the arrangement for swivelling said breech member.

3,997,995

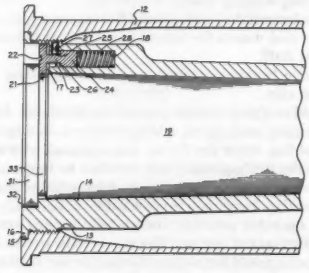
SALUTING ROUND ADAPTER

Elmer L. Hicks, Lanham, Md.; Robert L. Scheler, Anchorage, and Douglas E. Slayton, Louisville, both of Ky., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 19, 1976, Ser. No. 650,107

Int. Cl.² F41C *21/10*

U.S. Cl. 42—77 4 Claims



1. A saluting round adapter for firing small caliber blank ammunition in a larger caliber gun comprising,

a cartridge case having outside dimensions suitable for seating in a large caliber gun,

a sleeve positioned within said cartridge case and having inner dimensions suitable for seating small caliber ammuntion, and

a retaining pin rotatably mounted in said sleeve and having a head thereon engageable with the rim of a cartridge to be locked in said sleeve.

3,997,996

METHOD OF BAITING HOOKS AND APPARATUS FOR CARRYING OUT THE METHOD

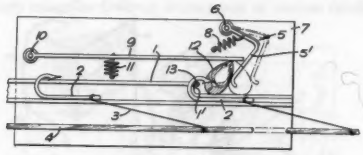
William Nygaard, Oslo, Norway, assignor to Mustad Industrier A/S, Oslo, Norway

Continuation of Ser. No. 527,558, Nov. 27, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 655,035

Claims priority, application Norway, Jan. 7, 1974, 37/74

Int. Cl.² A01K *91/00*

U.S. Cl. 43—4 2 Claims



1. A method of baiting a hook which is secured to a line by a snood for facilitating and ensuring hooking and conveyance of a bait piece, comprising the steps of advancing the hook along a predetermined path with its point directed along said predetermined path towards the bait piece; placing a finger member in the curve of the hook so that as the hook advances, it engages the finger member; applying force to the finger member to resist advancing movement of the hook; inserting the point of the hook into the bait piece until the bait piece is engaged by the finger member and the inside of the curve of the hook, whereby forces accelerating the bait piece are distributed over both the inside of the curve of the hook and the finger member; subsequently withdrawing the finger member from the curve of the hook; and returning the finger member to its position before it was engaged by the hook.

3,997,997

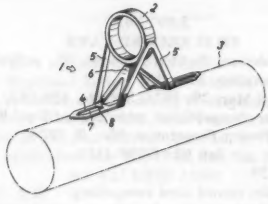
LINE GUIDE RING FOR FISHING ROD

Shigeru Yamamoto, Higashikurume, Japan, assignor to Daiwa Seiko Incorporated, Higashikurume, Japan

Filed Nov. 26, 1975, Ser. No. 635,777

Int. Cl.² A01K *87/04*

U.S. Cl. 43—24 3 Claims



1. A line guide ring assembly for a fishing rod comprising a pair of fixing frames large in width and made from a punched metal plate, a pair of inverted V-shaped ring holding frames formed integral with and in continuation to rear portions of

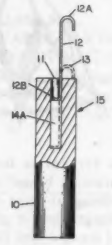
said fixing frames, said holding frames being bent up erect, an X-shaped ring supporting frame formed intermediate and in integral continuation to said fixing frames and positioned between said ring holding frames, said ring supporting frame being centrally bent up in the form of two inverted V-shaped portions which meet to define a top support surface, and a line-passing ring secured respectively at its respective sides to upper parts of respective ones of said inverted V-shaped ring holding frames and at its bottom to said top support surface of said centrally bentup ring supporting frame.

3,997,998

ICE FISHING HOOK RETRIEVER

Harry Petersen, Jr., 1860 Lark Lane, Waterloo, Iowa 50701

Filed Feb. 3, 1975, Ser. No. 546,336
Int. Cl.² A01K *97/00*
U.S. Cl. 43—53.5 **1 Claim**



1. An ice fishing hook retriever comprising in combination:
a solid elongated cylindrical handle member formed with a cavity extending inwardly of said handle from one end thereof, a straight wire shaft having a U-shaped hook on one end and a right-angularly bent arm at the other end, the said hook and arm lying in a common plane but extending away from the shaft in opposite directions, the length of said arm plus the thickness of said shaft corresponding to the diameter of said cavity, said shaft being disposed in said cavity for sliding movement therein with said hook being positioned outwardly of said one end of said handle, said shaft corresponding in length to the depth of the cavity, and a dowel pin having a diameter corresponding to the diameter of said cavity, said dowel pin being substantially shorter in length than said cavity and being frictionally fitted into the outer end thereof to close said cavity and secure said shaft and arm therewithin, whereby the pressure of the dowel pin on the shaft permits limited frictional movement of the shaft in said cavity by pulling or pushing said shaft while grasping said handle to extend said hook for use as a hook retriever or to retract and position said hook against said one end of said handle.

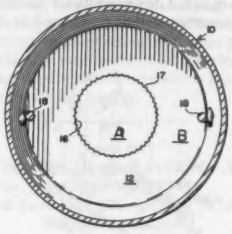
3,997,999

MOSQUITO TRAP

Ralph Carlysle Evans, 11241 - 3rd Ave., Gulf Marathon, Fla. 33050

Filed Mar. 25, 1976, Ser. No. 670,426
Int. Cl.² A01M *1/10*
U.S. Cl. 43—107 **5 Claims**

1. A mosquito trap comprising an open top receptacle for containing water and the like, a screen member mounted in substantially an upright position in said receptacle, said screen member dividing said receptacle into two chambers in side by side relation, cover means enclosing one of said chambers and food retaining means mounted in said one of said chambers remote from the other of said chambers whereby female mosquitoes are given access to that portion of said water placed in



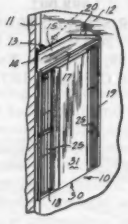
said receptacle that is positioned in said other of said chambers in order to permit them to lay their eggs thereon.

3,998,000

ELECTROCUTION TRAP FOR INSECTS

Donald E. Gilbert, 101 Chestnut St., Jonesboro, Ark. 72401

Filed Aug. 4, 1975, Ser. No. 601,268
Int. Cl.² A01M *1/22*
U.S. Cl. 43—112 **15 Claims**



1. A corner mounted insect trap comprising,
a vertically disposed light source having reflective surfaces positioned therebehind and having an open-sided enclosure through which light rays are projected and reflected, said enclosure having angularly disposed rear walls adapted for corner mounting on adjoining wall surfaces,
a flat panel formed of translucent material and extending across substantial portions of the open side of said enclosure to form an illuminated window closure intercepting the projected and reflected light rays for attracting insects,
said panel being sized of a lesser width than said open side to form elongated vertical transversely spaced apart openings on opposite sides of said flat panel and through which insects may enter the enclosure behind the panel,
and a killing grid inside of the enclosure adjacent the light source for electrocuting the insects.

3,998,001

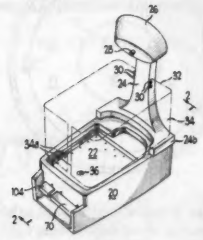
DOLL SHOWER AND BUBBLE BATH DEVICE

Burton C. Meyer, Downers Grove; Donald F. Nix, Hanover Park, and Derek A. Brand, Naperville, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 5, 1976, Ser. No. 655,420
Int. Cl.² A63H *3/52, 33/28*
U.S. Cl. 46—8 **12 Claims**

1. An amusement device in the form of an accessory for use in combination with a doll or other figurine, said device com-

prising: a base having a depression defining a tub for containing a body of liquid, such as water, for washing the doll during play; a shower head having a nozzle supported above said tub with the nozzle directed downwardly for delivering liquid into said tub for showering a doll positioned in the tub; pump



means for pumping liquid through said nozzle; first selectively operable means for actuating said pump means; aeration means for delivering air in the form of bubbles into a body of liquid in said tub for simulating a bubble bath effect; and second selectively operable means for actuating said aeration means.

3,998,002

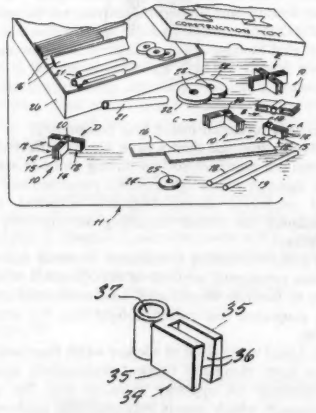
PANEL HOLDER FOR SMALL STRUCTURES AND TOYS

Albert Nathanson, 249 - 26 63rd Ave., Little Neck, N.Y. 11329

Filed Jan. 29, 1975, Ser. No. 544,949

Int. Cl.² A63H *33/10*

U.S. Cl. 46—17 **3 Claims**



1. In a panel holder, the combination of at least a single clip element and a sleeve element integrally secured together, said clip element consisting of a pair of spaced jaws forming a mouth therebetween, a flat panel fitted in said mouth being grasped frictionally by said jaws, and a peg or post frictionally fitted in an opening of said sleeve element, a longitudinal axis of said peg or post being at right angle to a direction into which said jaws extend, wherein a plurality of said panel holders having different numbers of said clip elements, comprise components of a construction toy, said toy also including a plurality of said panels of different sizes, a plurality of said pegs and said poles in various lengths, a plurality of tubes of various lengths for enjoining said plurality of pole or pegs, a plurality of wheels for frictionless fit on said poles or pegs, and a plurality of discs for friction fit on said poles or pegs, some of said panel holders having a different number of said clip elements than other of said panel holders, and said clip elements in some said panel holders being equidistant apart, while said clip elements in other said panel holders being unequidistant apart.

3,998,003

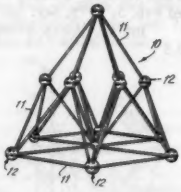
CONSTRUCTION TOY DEVICE

Sheldon Rosenbaum, 147-03 71st Ave., Flushing, N.Y. 11367

Filed Dec. 22, 1975, Ser. No. 643,198

Int. Cl.² A63H *33/08*

U.S. Cl. 46—25 **8 Claims**



1. A construction toy device for the formation of three dimensional configurations based upon interlocked equilateral triangles comprising at least six elongated, rigid strut members of equal length and a plurality of elastic linking members adapted to receive and frictionally retain end portions of said strut members, said linking members being of generally spherical shape and including a plurality of angularly spaced-apart, radially directed frictional support sockets extending from the surface at least part way toward the center thereof, and sized yieldingly and frictionally to retain end portions of said struts while permitting a degree of angular bodily movement of said struts, said sockets including and being located as follows:

a. a first series of six said sockets lying on the equator of said sphere, the sockets of said first series being equally spaced apart along said equator an angular distance of about 60°;

b. second and third series of six sockets each, the sockets of said second and said third series being arrayed between said equator and the North and South poles of said sphere, respectively, the sockets of said second and third series lying on small circles of said sphere, the planes of said small circles being parallel to said equator, said sockets of said second and third series being equally spaced apart on their respective small circles, each socket of said second and third series being angularly offset at an angle of about 60° from two adjacent sockets of said first series.

3,998,004

GEOMETRIC CONSTRUCTION KIT

Brent H. Ehrlich, R.R. 1, Murphysboro, Ill. 62966

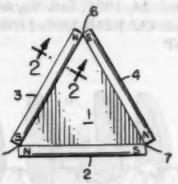
Filed May 27, 1975, Ser. No. 580,981

Int. Cl.² A63H *33/10, 33/26*

U.S. Cl. 46—30 **11 Claims**

1. A construction kit comprising a plurality of substantially planar members having edges, the perimeters of said members as constituted by said edges forming polygons, each of said members having a magnet longitudinally arranged along each of the edges thereof, said magnets being oriented such that at each vertex of said polygon-shaped member the polarities of the adjacent magnets are opposite, said arrangement resulting in an attraction between the edge magnets of members having the same magnet arrangement,

whereby two-and three-dimensional objects can be fabricated from a multiplicity of said members held together



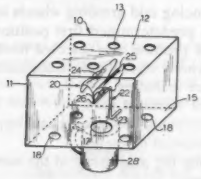
by the attractive forces between the magnets of adjacent members.

3,998,005

DEVICE WITH MOVABLE PARTS MADE FROM MATERIAL AND SENSITIVE TO MOIST GAS

Lee V. Way, Rte. 3, Box 333C, Wilmington, N.C. 28401

Filed Apr. 17, 1975, Ser. No. 569,190
Int. Cl.² A63H *13/02*
U.S. Cl. 46—41 10 Claims



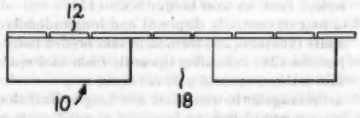
1. An amusement device comprising, in combination:
a. a support;
b. a source of relatively warm moisture laden gas;
c. a selected number of elements of predetermined configuration made from thin, flexible sheet material, each said element having means rendering it sensitive to moisture laden gas whereby contact of said elements with said gas produces relatively continual flexing movement of a portion of said element, each said element being secured to said support in such a manner that a portion of the sheet material remains free to move in the presence of said gas; and
d. means for locating said support proximate said source.

3,998,006

MULTIPLE PURPOSE AGRICULTURAL WEED SUPPRESSANT AND GROWTH ENHANCEMENT BLANKET

Frederick H. Riedel, Cloquet, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Feb. 19, 1976, Ser. No. 659,287
Int. Cl.² A01G *7/00*
U.S. Cl. 47—9 17 Claims



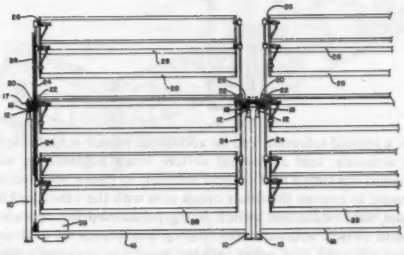
1. An agricultural growth control device comprising:
a. a flexible, substantially light impermeable sheet containing a plurality of openings; and
b. fibrous blanket material affixed to said impermeable sheet, said fibrous blanket material being at least 50% by volume cellulosic fibers and, the bottom of said fibrous blanket material being adapted to laying upon the earth, said fibrous blanket material being affixed to said sheet in a discontinous manner whereby certain portions of the sheet overlie the earth without intervening fibrous blanket material therebetween, whereby a plurality of miniature greenhouses are formed.

3,998,007

PLANT SUPPORTING AND WATERING APPARATUS

Melvin S. Martin, Martindale, Pa. 17549

Filed June 16, 1975, Ser. No. 587,273
Int. Cl.² A01G *9/24*
U.S. Cl. 47—39 9 Claims



1. In a plant-growing structure comprising a multiple-shelved unit, said unit having a central rotatable, hollow shaft comprising conduit means for carrying a liquid, means supporting said shaft, spaced hub members on said shaft with each of said hub members supporting a plurality of radially-projecting spokes comprising conduit means for carrying a liquid, and means carried by said spokes for suspending shelves therefrom, said suspending means permitting said shelves to maintain substantially horizontal positions during the rotation of said shaft, the improvement wherein said shaft has means for the connection of the hollow interior thereof with a liquid supply, there is means providing communication for liquid between the conduit means of said shaft and the conduit means of the spokes supported by one of said hub members and said shelf-suspending means carried by said last-mentioned spokes comprises means in communication with the conduit means of said last-mentioned spokes for delivering water to said shelves suspended thereby.

3,998,008

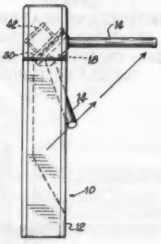
TURNSTILE HEAD MECHANISM CONSTRUCTION

Terence J. Collins, Schaumburg, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Apr. 30, 1975, Ser. No. 572,962
Int. Cl.² E06B *11/08*
U.S. Cl. 49—47 27 Claims

1. In a turnstile construction wherein arm means block the path of movement of persons passing the turnstile, said arm means being engaged by said persons and being movable out of a blocking position as the persons pass through the turnstile, and control means including locking and unlocking means for said arm means, the improvement in said control means comprising a drive gear tied to said arm means, first and second rotatable locking means operatively connected to said drive gear, first and second engaging means for said locking means, means normally holding at least one engaging means in engagement with a locking means, and means for disengaging said engaging means upon receipt of a fare by said construction, said engaging means comprising crank arms, spring means normally urging at least one of said crank arms

into position for engagement with a locking means, a solenoid attached to said one crank arm, said solenoid operating in response to the receipt of a fare to disengage said one crank arm with respect to the locking means engaged thereby, and including electrical switch means, a rotatable switch actuator, means connecting said switch actuator to said drive gear, said switch actuator rotating during movement of said arm means, a switch actuatable by said actuator connected to said solenoid for operating said solenoid to return said one crank arm to engaging position after a person passing through the turnstile, a second solenoid, and an additional switch actuatable by said actuator, said additional switch, when actuated by said actuator, operating said second solenoid to cause said second solenoid to engage the other crank arm with the other locking means, said additional switch being positioned for operation by said switch actuator after partial movement of said arm means whereby said other locking means is engaged against movement during the balance of the movement of said arm means to permit movement of the arm means in only one direction.

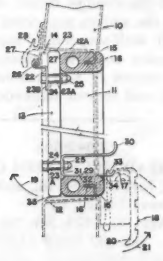


3,998,009

FRAMELESS WINDOW SASH CONSTRUCTION FOR MOTOR COACHES AND THE LIKE

Adam Niessner, Winnipeg, Canada, assignor to Motor Coach Industries Limited, Winnipeg, Canada

Filed Jan. 13, 1976, Ser. No. 648,625
Int. Cl.² E05C *19/00*
U.S. Cl. 49—394 **2 Claims**



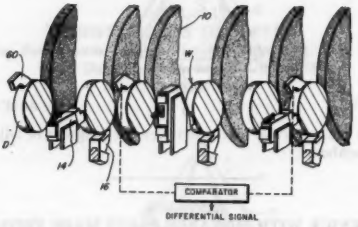
1. A frameless window panel comprising a substantially planar frameless sheet of window material, hinge plates secured adjacent one edge thereof and spaced inwardly therefrom and catch plates secured to an opposite edge thereof and spaced inwardly therefrom, and at least one pull handle secured to said panel adjacent said opposite edge, the portions of said hinge means and the portion of said detachable latch means secured to said window panel including planar portions, a shock absorbing bushing extending through apertures formed through said panel and fastening means extending through said hinge plate and said bushing adjacent said hinge plate and further fastening means extending through said catch plate and said bushing adjacent said catch plate.

3,998,010

CYLINDRICAL GRINDER

James C. Harris, Waynesboro, Pa., assignor to Landis Tool Company, Waynesboro, Pa.

Filed Dec. 24, 1975, Ser. No. 644,121
Int. Cl.² B24B *5/04, 51/00*
U.S. Cl. 51—105 SP **3 Claims**



1. A cylindrical grinder for simultaneously effecting stock removal from a plurality of work diameters of a rotating driven workpiece comprising

a grinding wheel assembly including a plurality of grinding wheels,

means for advancing said grinding wheels toward the workpiece from a predetermined first position to a predetermined second position at a selected feed rate,

a workrest assembly operatively associated with a central work diameter including

upper and lower workrest jaws,

means for incrementally displacing said upper workrest jaw towards the central diameter,

means for sensing the magnitude of the non-linearity of the workpiece, and

means for conjointly deenergizing said advancing means and energizing said incrementally displacing means during the advancement of said grinding wheels from said first position to said second position when the magnitude of the non-linearity sensed by said sensing means exceeds a predetermined maximum value.

3,998,011

HONING TOOL

William G. Corley, Dearborn Heights, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Oct. 6, 1975, Ser. No. 619,742
Int. Cl.² B24B *33/02, 33/08*
U.S. Cl. 51—338 **6 Claims**

1. A honing stone for use in a honing tool having expansion means provided with plurality of wedge-like cam member bodies and a cam surface angle thereon, comprising;

A. a holder body (13) said holder body being an inverted T-shaped in cross section comprising;

1. a centrally disposed and longitudinally extended raised portion (26) rectangular in cross section;

2. a pair of outwardly extended flanges (27) integrally connected to the rear end of said central portion (26);

3. the rear faces of said flanges (27) and the rear face of said central portion (26) provides a parallel flat rear holder face for said holder body (13);

4. a pair of centrally disposed and longitudinally spaced apart recesses (28) formed in said holder body central portion (26) extending inwardly from said rear face of said holder, each of said recesses;

a. rectangular in transverse and longitudinal shape; and

b. communicating at one end thereof with a recess which has an inclined lower surface (29);

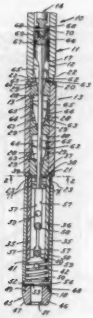
5. each of said inclined surfaces (29) disposed in the same direction and equally spaced longitudinally of said honing body (13) to provide a plurality of expansion

angled surfaces for engagement with each of said wedge-like cam members (63); and

B. An abrasive bonded to said holder body, said abrasive:

1. being U-shaped in cross-section;

2. a central, longitudinally extended body portion that is integral with a pair of side portions (31);



3. said outer sides of said abrasive are parallel with outer sides of said rear holder flanges (27) and perpendicular to said rear face of said holder; and

4. the outer surface of said abrasive being convex (32).

3,998,012

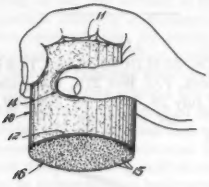
ABRADING ARTICLE

Reuben Ness, 1028 Pinewood Court, Indianapolis, Ind. 46240

Filed Apr. 10, 1974, Ser. No. 459,706

Int. Cl.² B24D *15/04*

U.S. Cl. 51—391 **1 Claim**



1. An abrasive article comprising a body formed of cellular plastic material carrying on its bottom end a piece of foundation material having adhered thereto on one side a layer of abrasive material such as used for sanding or scouring and on the opposite side a layer of adhesive material releasably attaching said foundation to the bottom surface of the cellular plastic material of said body, said body having a width of about three inches to fit within the palm of the hand of a medium-size user of the article and a height of about 2 and one-half inches whereby the bottom of the body extends beyond the tips of the user's fingers to keep them from protruding beyond the bottom of the body and engaging and possibly being injured by accidental contact with the article being worked upon, said body being resiliently crushable by the ends of the user's fingers while firmly gripping the sides of the body and the latter being axially resiliently compressible to cushion the pressure of the user's hand applied to the top end of the body in use, said foundation material being in the form of a shallow cup having a flat bottom and an integral rim portion projecting upwardly from said flat bottom and positioned to fit and slidably receive the bottom portion of said body, said abrasive material being carried on the exterior of the bottom and rim portion of said cup, said cup having on at least a portion of its interior surface said adhesive material by which the cup is releasably secured to the bottom of said body of cellular plastic material.

3,998,013

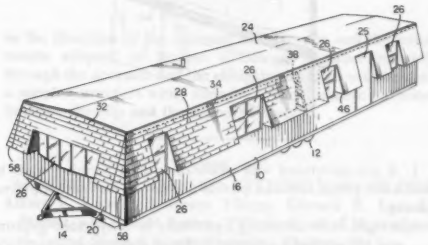
COLLAPSIBLE MANSARD ROOF STRUCTURE FOR TRANSPORTABLE BUILDING

Norton C. Barnett, Elkhart, Ind., assignor to Admiral Homes, Inc., Elkhart, Ind.

Filed Apr. 30, 1975, Ser. No. 573,020

Int. Cl.² E04B *7/16*

U.S. Cl. 52—69 **7 Claims**



1. In a transportable building having outer walls and a roof; mansard means extending along the upper portion of the outer walls, hinge means for pivotally connecting the upper edge region of the mansard means to the building near the outer edge of the roof, and truss means hingedly connected to the side of the mansard means facing the outer walls and having a folded in position substantially parallel to the plane of the mansard means and having a folded out position perpendicular to the plane of the mansard means to support the mansard means on the outer walls in erected outwardly inclined position, said outer walls of the building including parallel side walls and a rear wall and a front wall connecting the rearward and forward ends respectively of the side walls, said mansard means comprising portions which include means for the hinged connection of the upper edges to the building near the side and rearward edges of the roof, and a mansard roof section extending across the upper portion of the front wall of the building and non-hingedly connected thereto.

3,998,014

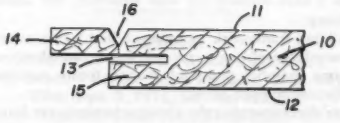
PROTECTIVE EDGE CONFIGURATION FOR STRUCTURAL SHEETING

Harold Bartels, Villa Park, and Albert F. Kuhr, Elk Grove Village, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 621,983

Int. Cl.² E04B *1/86*

U.S. Cl. 52—100 **10 Claims**



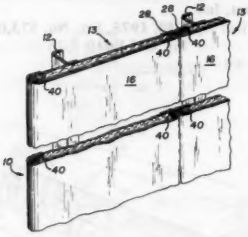
1. A fibrous ceiling tile comprising a panel with an edge on the outside perimeter thereof, said panel kerfed around the edge thereof and having an extended edge portion provided on one side of said kerf, thereby protecting the remaining edge portion from damage during handling, said extended edge portion being weakened along a line corresponding to the remaining edge portion thereby enabling the extended portion to be easily broken away for installation.

3,998,015

RESILIENT-EDGED WALLBOARD AND WALL ASSEMBLED THEREWITH

Junior L. Scott, Mount Prospect; Fred H. Zajonc, Palatine, and John H. Crumbaugh, Clarendon Hills, all of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed July 26, 1973, Ser. No. 382,805
Int. Cl.[2] E04B *1/60*; E04C *2/00*; B32B *31/14*
U.S. Cl. 52—222 **4 Claims**



1. A pre-decorated wall panel for use in forming walls in which the joints between panels are not to be finished, comprising:

1. a rigid core consisting essentially of rehydrated gypsum and having front and rear surfaces and spaced-apart side edge surfaces,
2. a layer of resilient, deformable material disposed along at least a portion of at least one of said core side edge surfaces and being adhesively affixed to at least a portion of a surface of said core, and
3. a decorative sheet covering the front surface and side edge surfaces of said panel and said layer of resilient deformable material, and being adhesively affixed to the back of said panel, said decorative sheet being under tension in the vicinity of said one core edge surface thereby partially compressing said deformable material, whereby two or more panels may be positioned with their core edge surfaces adjacent to each other and with said resilient material further compressed to form to joint between the panels wherein the sheets of adjacent panels are in intimate and contiquous contact along the panel edge portions, and wherein said resilient material is disposed between said sheet and said core over the entire core front surface and said one core edge surface.

3,998,016

BLOW-IN/BLOW-OUT WALL STRUCTURE

Raymond M. L. Ting, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 557,998, March 13, 1975. This application Nov. 6, 1975, Ser. No. 629,418
Int. Cl.[2] E04C *2/46*; E04B *1/98*
U.S. Cl. 52—232 **38 Claims**

1. In a blow-in/blow-out wall structure, the combination comprising:

a building framework including a first frame member and spaced therefrom a second frame member, said first frame member and said second frame member being adjacent to each other;

a liner sheet spanning the distance between the frame members and having a liner sheet end lapping said first frame member;

confinement means releasably retaining said liner sheet end to said first frame member;

fastening means positively securing said liner sheet to said second frame member;

a facing sheet positioned outboard of and in spaced-apart parallel relation with said liner sheet; and

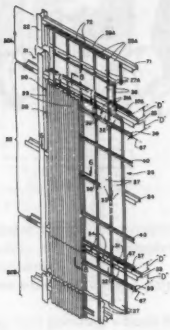
at least first and second subgirts

a. entirely spaced-apart from said first frame member in the direction of said second frame member and from each other,

b. positioned between said facing sheet and said liner sheet, and

c. each secured to said facing sheet and to said liner sheet;

the first subgirt and said first frame member being adjacent to each other;



said facing sheet having an end portion extending from the first subgirt as a free-ended cantilever and confronting said confinement means;

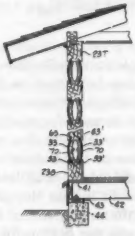
the first subgirt being positioned at a selected distance from said first frame member, whereby said wall structure is adapted to disengage from said confinement means at an applied load determined by said selected distance and to collapse in the direction of the applied load, but remain positively connected to said second frame member.

3,998,017

LOG BUILDING STRUCTURE

Donald M. Whitlock, P.O. Box 278, Troutville, Va. 24175

Filed July 28, 1975, Ser. No. 599,332
Int. Cl.[2] E04B *1/10*
U.S. Cl. 52—233 **11 Claims**



1. A log cabin structure comprising load-bearing logs or timbers and essentially load-free panels disposed therebetween forming end-adjacent walls having end portions of said timbers interdigitated in direct load bearing relationship one on the other, free of a common vertical loadbearing member, each end-adjacent wall having plural horizontal timbers of generally uniform cross section maintained in spaced apart parallel relationship by interdigitation of said end portions, said timbers having a pair of longitudinal grooves in the upper

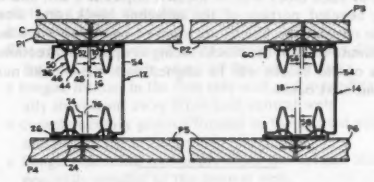
and lower faces thereof, said grooves being in parallel spaced apart relationship over the length of said timbers, and said grooves having a preselected depth and width chosen so that each groove snugly accommodates one longitudinal edge of each of a pair of essentially no-load-bearing elongated laminar plastic panels to form a confined zone bounded by upper and lower timber surfaces, the inner surfaces of said panels and end surfaces of timbers of another wall, and fastening means to fasten said timbers rigidly relative to one and another.

3,998,018

WALL PANEL MOUNTING SYSTEM

Jack D. Hodges, Oakland, Calif., assignor to Kaiser Cement & Gypsum Corporation, Oakland, Calif.

Filed Mar. 31, 1975, Ser. No. 563,584
Int. Cl.² E04B *2/76, 2/82*
U.S. Cl. 52—481 **11 Claims**



1. In combination with a wall panel of a given thickness, improved mounting apparatus therefor, comprising: a vertically extending stud having fastening means thereon for engagement by a fastener; a generally U-shaped base member defined by a planar web having a width less than the panel thickness and first and second plate portions integral with said web and extending from opposite edges of one side thereof, the side of said web opposite said one side being substantially devoid of projections, said first plate portion penetrating the edge surface of the panel to secure the base member to the panel and against movement relative thereto, with the second plate portion lying on the rear surface of the wall panel, said second plate portion defining a horizontally elongate slot bounded on two opposed sides by planar margins of said second plate portion; and a fastener having two oppositely extending co-planar tabs engaging respective said planar margins in face-to-face contacting relation intermediate said second plate portion and the rear surface of the wall panel, said co-planar tabs being slidable beneath said margins in a direction parallel thereto to afford horizontal movement of said fastener to divers positions along said slot whereby said fastener may move to accommodate horizontal movement of a panel relative to the vertically extending stud, said fastener having attachment effecting means intermediate said tabs and projecting through the slot of the base member and engaged with the fastening means of the stud.

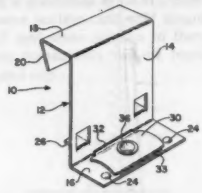
3,998,019

ROOF PANEL FASTENER AND JOINT CONSTRUCTION

Ernest William Reinwall, Jr., McHenry, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 18, 1975, Ser. No. 605,473
Int. Cl.² E04C *2/08*
U.S. Cl. 52—478 **18 Claims**

1. A device for securing abutting edges of roof panels to each other and to a supporting structure in a concealed manner and to permit expansion and contraction of the roof panels, the assembly comprising a clip member including a base flange portion and lip portion interconnected by an upstanding web portion, an elongate slot formed in the base flange, a spring member preassembled to the flange of the clip member and over the elongate slot, the spring member having an arched configuration providing a pair of spaced elongated flange abutting edges and a crest portion intermediate said edges, an aperture formed through the crest portion of the spring, tubular means extending through the elongate slot assembling the spring to the base in a compressed condition while allowing the clip member to move relative to the spring



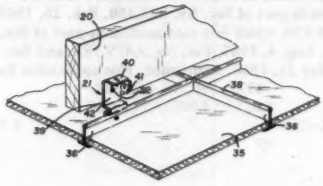
in the direction of the elongate slot, the clip and the tubular means adapted to receive a fastener member extending through the aperture and the elongate slot to secure the clip to a support structure while allowing limited relative movement between the clip and the support structure.

3,998,020

ADJUSTABLE SUSPENSION SYSTEMS FOR CEILINGS

Albert F. Kuhr, Elk Grove Village; Edward R. Lau, Des Plaines, and Harold Bartels, Villa Park, all of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,308
Int. Cl.² E04B *5/52;* **E04C** *1/10*
U.S. Cl. 52—484 **6 Claims**



1. An apparatus for concurrently leveling and attaching suspended ceilings to supporting structures, said apparatus comprising:

an upper body portion comprising a back plate having attached thereto a top plate and a side plate, each of said plates lying in a plane substantially perpendicular to the plane of each of the other two plates, and each of said plates having means for connection to a supporting structure; and, a flange downwardly extending from the upper body portion for engaging the supporting portion of a suspended ceiling; and wherein the downwardly extending flange has a clip encircling a portion of the bottom thereof and an inverted-T runner is attached to the flange through the clip.

3,998,021

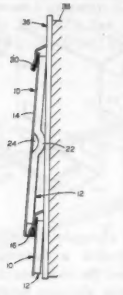
INSULATED SIDING PANEL ASSEMBLY

Eugene R. Lewis, 9 Candee Road, Prospect, Conn. 06712

Filed Sept. 8, 1975, Ser. No. 611,192
Int. Cl.² E04B *1/62;* **E04D** *1/28*
U.S. Cl. 52—531 **11 Claims**

1. An insulated siding panel assembly comprising an elongated outer panel formed of deformable sheet material and having a body section providing parallel inside and outside faces and a flange extending along at least one longitudinal edge thereof; and an elongated synthetic resin backing member of greater thickness than said sheet material of said outer panel and having generally planar parallel major surfaces with one of said major surfaces being disposed against said inside

face thereof, the other of said major surfaces having at least one rib thereon spaced intermediate the longitudinal edges thereof and projecting away from said inside face of said outer



panel to provide a surface for abutment against the surface of a wall upon which said panel assembly is mounted, and wherein said backing member provides resistance to deformation of said outer panel.

3,998,022

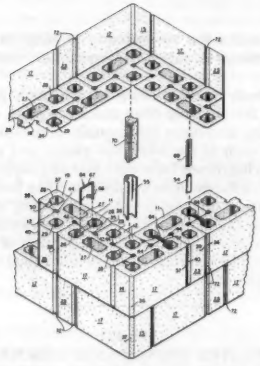
INTERLOCKING BUILDING BLOCKS

George B. Muse, Hillcrest Drive, Calhoun, Ga. 30701

Continuation-in-part of Ser. Nos. 252, Jan. 2, 1970, Pat. No. 3,864,885, and Ser. No. 462,376, , each is a continuation-in-part of Ser. No. 802,450, Feb. 26, 1969, Pat. No. 3,609,926, which is a continuation-in-part of Ser. No. 658,524, Aug. 4, 1967, Pat. No. 3,479,782, and Ser. No. 730,727, May 21, 1968, abandoned. This application Feb. 10, 1975, Ser. No. 548,385

Int. Cl.[2] E04C *1/10, 1/16*

U.S. Cl. 52—574 6 Claims



1. An approximately T-shaped symmetrical building block comprising an elongated main body portion of a length substantially three times its width with vertical end walls and vertical side walls intersecting a side body portion of a length and width each approximately equal to the width of said main body portion and extending from one side of said main body portion and including vertical end walls intersecting a vertical side wall, a pair of vertical external slots formed in and extending through said building block with each slot positioned inwardly of the junction of a vertical side wall of the main body portion and a vertical end wall of the side body portion and both slots extending inwardly of the planes of the vertical end walls of the side body portion and partially offset inwardly of the plane of the vertical side wall of the main body portion with the openings of the slots facing in opposite directions toward the ends of the block, the side wall of said main body portion facing said side body portion being beveled adjacent said side body portion with the beveled portions merging with said slots, the side walls of said main body portion being beveled at the intersection of each side wall with each end wall of said main body portion, and the side wall of said side body portion being beveled at the intersection of the side wall with each end wall of said side body portion, whereby when duplicate ones of the block are arranged in a double thickness of blocks in a single course of blocks with alternate ones of the blocks having their side body portions positioned in abutting end-to-end relationship with respect to the main body portions of the other blocks, the beveled portions of the main body portions of each block will be located adjacent a slot and its merging beveled portion of the adjacent block, and when duplicate ones of the blocks are stacked one upon the other with alternate ones of the blocks facing in opposite directions, the slots of the blocks will be aligned with the blocks next above and next below.

3,998,023

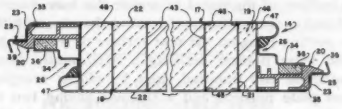
DOUBLE-SKIN INSULATED BUILDING PANEL

John W. Anderson, Bradford Woods, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Aug. 4, 1975, Ser. No. 601,342

Int. Cl.[2] E04C *2/36*

U.S. Cl. 52—595 6 Claims



1. A building construction panel of the type comprising a pair of facing sheets and an insulating core disposed therebetween,

each facing sheet including

a central web,

first and second side walls extending in the same direction from opposite side edges of the central web,

a tongue formed in the first side wall and extending laterally therefrom away from said central web,

a complementary groove formed in the second side wall and extending inwardly therefrom, and

a flange extending outwardly from the second side wall generally parallel to the central web,

the facing sheets being assembled with the flange of each facing sheet confronting the opposing central web of the other facing sheet and being laterally spaced-apart from the first side wall of the other facing sheet; and

rigid longitudinal rails, one positioned along each side of said panel between the flange and the central web, and thermally insulating said facing sheets from each other, each of said rails comprising

a profiled metal element secured to the central web of one facing sheet and having an arm extending interiorly of the tongue of said one facing sheet, and

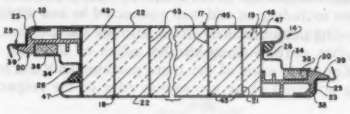
an isolation strip of thermal insulating material disposed between and secured to said profiled metal element and the flange of the other facing sheet.

3,998,024

DOUBLE-SKIN INSULATED BUILDING PANEL

LeRoy Frandsen, San Marino, Calif., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Aug. 4, 1975, Ser. No. 601,296
Int. Cl.² E04C 2/36
U.S. Cl. 52—595 7 Claims



1. A building construction panel of the type comprising a pair of facing sheets and an insulating core disposed therebetween,

each facing sheet including

a central web,

first and second side walls extending in the same direction from opposite side edges of the central web,

a tongue formed in the first side wall and extending laterally therefrom away from said central web,

a complementary groove formed in the second side wall and extending inwardly therefrom, and

a flange extending outwardly from the second side wall generally parallel to the central web,

the facing sheets being assembled with the flange of each facing sheet confronting the opposing central web of the other facing sheet and being laterally spaced-apart from the first side wall of the other facing sheet; and

said insulating core comprising

an expanded honeycomb core member disposed between and secured to the central webs of the facing sheets and extending transversely between the complementary grooves of said facing sheets; and

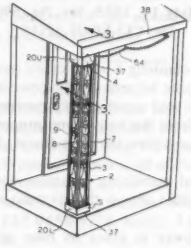
rigid spacing means, one positioned along each side of said panel between the flange and the central web, and thermally insulating said facing sheets from each other, each said spacing means comprising a rigid longitudinal rail secured to the flange of one facing sheet and to the central web of the other facing sheet, each said rail including an arm extending interiorly of said tongue.

3,998,025

COMBINATION LIGHT FIXTURE AND POST STRUCTURE

Joseph F. Nestroy, 4523 Knoxville Ave., Lakewood, Calif. 90713

Filed Jan. 2, 1973, Ser. No. 320,436
Int. Cl.² E04G 25/04, 12/18
U.S. Cl. 52—632 4 Claims



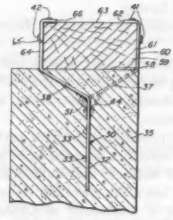
1. A post assembly for supporting a supported structure from a supporting structure, comprising telescoping close fitting inner and outer sections, and means for relatively deflecting at least one of said sections transaxially to contract and expland said sections relative to each other to accommodate axial adjusting movements therebetween and to lock the same to each other and said other of said sections comprising end caps sleeved over the inner of said sections, and said inner section comprising a skeletal peripheral end portion, and said means comprising a transaxial bracket connected to said end portion of said inner section, and said means deflecting said bracket axially of said inner section to thereby deflect said peripheral portion transaxially out of binding engagement with the related end cap.

3,998,026

TYING DEVICE FOR TYING WOODEN MEMBERS TO MASONRY AND CONCRETE STRUCTURES

George E. Allen, Dolton, Ill., assignor to Allen Anchor Corporation, South Holland, Ill.

Filed June 3, 1976, Ser. No. 692,466
Int. Cl.² E04B 1/42
U.S. Cl. 52—714 12 Claims



1. A tying device for tying a wooden member which includes spaced side walls and spaced top and bottom walls to a surface of a masonry or concrete structure, comprising:

a. a tying member formed from a strip of bendable flat metal stock, cut, shaped and sized to provide

1. a body including

a. an anchor portion adapted to be anchored in a masonry or concrete structure;

b. a pair of bendable tying arms having integral hinge connections to the said anchor portion and adapted to be bent along said hinge connections angularly outwardly and upwardly on opposite sides of the said anchor portion;

b. each of said bendable tying arms including

1. a portion extending in use angularly outwardly and upwardly from the said anchor portion, and including

2. angularly extending portions adapted in use to be bent upwardly over one of the said walls of the said wooden member and fastened to the said one wall of the said wooden member with the bottom wall of the said wooden member resting on the said surface of the said masonry or concrete structure;

c. the said tying device including

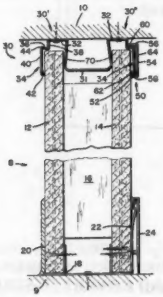
1. limiting and stop means cooperating with the said anchor portion of the said body of the said tying device for limiting the outward bending movement of the said bendable tying arms and for positioning the said tying arms in a preselected angular position relative to each other and relative to the said anchor portion and an opposite sides thereof.

3,998,027

DECORATIVE RUNNER AND WALL

Alan C. Wendt, Barrington, and Nels Nelsson, Des Plaines, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed June 8, 1972, Ser. No. 263,351
Int. Cl.² E04B *2/74*
U.S. Cl. 52—716 3 Claims



1. In a ceiling runner for holding wallboards spaced apart in a wall, the runner including a ceiling mounting portion and restraining means for holding the wallboard in proper position; the improvement comprising

at least one flange having

a portion extending downwardly from said mounting portion,

a portion connected to said downwardly extending portion extending outwardly and upwardly to form a shadow-creating shoulder offset from said downwardly extending portion,

a downwardly extending decorative surface portion connected to said shoulder adapted to be spaced apart from the wallboard surface and terminating at its lower portion in an inwardly directed flange acting as a restraint against a wallboard mounted in said runner against outward movement, and

a downwardly-directed trim element removably mounted over said flange and extending from said shoulder said inwardly directed flange, said trim element having a sheet-form body, a flange at its upper edge provided with detent means adapted to engage said shoulder, and an inwardly directed flange at the bottom edge of said trim element having an upturned edge engaging said decorative surface, said trim element being detachably affixed to said decorative surface by the clamping action of the upper and lower flanges of said trim panel against the shoulder and lower flange of said decorative surface and further including a door stop header supported by said inwardly directed flange.

3,998,028

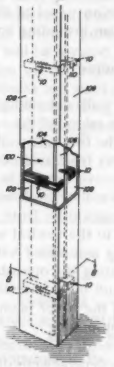
FURRING AND FIREPROOFING PROTECTION CLIP ASSEMBLY

John Pelletier, 42 Wellwood Circle, Rockville, Conn. 06066, and Eugene H. Soucy, 16 Richard St., West Hartford, Conn. 06119

Continuation-in-part of Ser. No. 383,570, July 30, 1973. This application May 2, 1975, Ser. No. 573,829
Int. Cl.² E04C *3/30*
U.S. Cl. 52—727 5 Claims

1. A clip assembly for attaching a member to a support covered with a fireproofing material, comprising, in combination:

a. a pair of clip sub-assemblies, each one of the clip subassemblies provided with a surface arranged for engaging a support and maintaining the integrity of a layer of a fireproofing material selectively provided on the support, the support engaging surface including a plate portion extending in a plane and defining in the plane a surface substantially in the form of the outline of a right triangle, and each of the clip sub-assemblies including a base portion connected to and arranged extending perpendicularly from an edge of the associated plate portion, and further including an end wall connected to and arranged extending perpendicularly from both the base portion and the plate portion along parallel edges of the base and plate portion, each of the plate portions and end walls being arranged along a common edge of the respective base portions, the end walls arranged for selectively supporting wallboard furring the support;



b. attaching means associated with the base portions of the clip sub-assemblies for selectively and adjustably connecting the sub-assemblies to one another; and

c. a support member having a pair of spaced, parallel flanges connected together by a web and providing a cross-section in the form of an I, the support engaging surfaces of the clip sub-assemblies being arranged engaging respective ones of the flanges, a member supported adjacent the support member by the clip assembly formed from the clip sub-assemblies, and wallboard attached to the end walls of the clip sub-assemblies and spaced from the flanges for partially enclosing the support.

3,998,029

TOWER CRANE CLIMBING

Arthur M. James, 2475 NW. 158th, Beaverton, Oreg. 97005, and Charles J. Conlee, 6938 SW. 8th, Portland, Oreg. 97219

Filed July 11, 1975, Ser. No. 595,072
Int. Cl.² E04H *12/34*
U.S. Cl. 52—747 12 Claims

1. A method of climbing a tower crane having a stationarily positioned base frame adjacent and supporting the base of the tower in the crane and a stationarily positioned upper frame spaced upwardly from the base frame supporting the tower at a location disposed above the base frame, the method comprising

providing lateral stabilizing structure for the tower at a location elevated above the location supported by the upper frame,

elevating the tower to place its base adjacent the upper frame and then securing the tower to the upper frame,

freeing the base frame of its stationary positioning and elevating the base frame to a location more nearly under the upper frame with the base frame then being reestablished in a stationary position, and

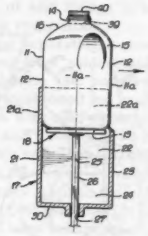
releasing the tower from the upper frame and then dropping the tower on the base frame.

3,998,030

FLEXIBLE WALL PLASTIC BOTTLE FILLING APPARATUS AND METHOD

Roy H. Straub, 15604 Pintura Drive, Hacienda Heights, Calif. 91745

Filed Apr. 21, 1975, Ser. No. 569,983
Int. Cl.² B65B 3/04
U.S. Cl. 53—37 20 Claims



1. Method of giving dimensional stability to a succession of flexible walled containers during processing of the containers to receive flowable material, the containers characterized by nominal manufacturing tolerances, said method including:

a. successively sidewardly introducing the containers at a first station respectively into vertical alignment with a series of like, rigid, dimensionally sized receptacles, and lowering the containers therein while maintaining the containers surrounded on all sides of the receptacles,

b. traveling the receptacles with the containers therein successively to a second station,

c. introducing flowable material into each container at said second station in a manner to cause the sized receptacle to sidewardly absorb the pressure of the material contents of the surrounded container at said station, the containers being moved vertically in and relative to the bounding receptacles both prior to and subsequent to said introduction of the flowable material,

d. traveling each container in succession to a third station,

e. effecting closing of each container at said third station, said closing being air tight thereby to allow removal of the sized container from the receptacle in a manner such that the internal pressures previously sidewardly absorbed by the receptacle are absorbed by the walls of the removed container while the internal volume of the removed container remains the same, whereby tight control on volume and weight of said contents is achieved,

f. traveling each closed container in succession to a fourth station, and

g. effecting said removal of the closed container from its receptacle at said fourth station.

3,998,031

APPARATUS AND METHOD FOR THE PREPARATION OF ENCLOSED SANITARY PRODUCTS

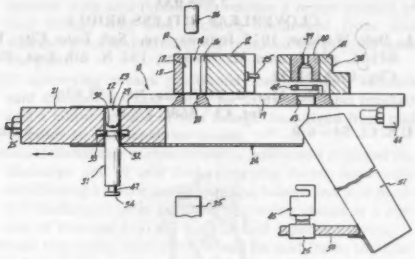
William H. Kopatz, Levittown; Rey W. Cooper, Bryn Athyn, and Russell W. Watson, Hatboro, all of Pa., assignors to W. R. Grace & Co., New York, N.Y.

Filed May 7, 1975, Ser. No. 575,197
Int. Cl.² B65B 1/24, 63/02, 51/14
U.S. Cl. 53—124 R 15 Claims

1. An apparatus for the compression and enclosure of a foam pre-form to prepare an enclosed sanitary device which comprises:

A. at least one die member comprising a plurality of laterally reciprocable die faces cooperating with a stationary die face to define a cylindrical die cavity of reduced diameter, said die member adapted to radially compress a pre-form placed therein into a cylindrical shape;

B. a base member comprising a stationary base plate directly adjacent one end of said die member, and a reciprocable carriage member slidably engaging said base plate, said base member possessing an orifice comprising a stationary opening located within said base plate in fixed alignment with said die cavity, and a receptacle located in said carriage comprising a cylindrical side wall



defined by said carriage and a concave movable end wall defined by an axially reciprocable container support member, said receptacle providing a cavity for supporting a container, and said orifice aligned with said die cavity for the engagement of said pre-form with said container; and

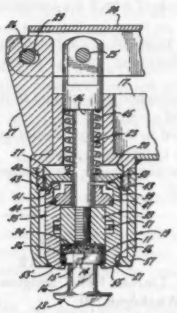
C. at least one ram member adjacent the opposite end of said die member and in axial alignment therewith adapted to telescopically engage said die cavity and axially urge said pre-form into said container to form said device.

3,998,032

BOTTLE CAP CRIMPER

Richard J. Koebbeman, c/o The Kebby Co., 4910 Kilburn Ave., Rockford, Ill. 61103

Filed Mar. 4, 1976, Ser. No. 663,982
Int. Cl.² B65B 7/28; B67B 3/14
U.S. Cl. 53—352 24 Claims



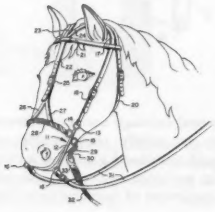
1. A hand-held tool for crimping a cap on the top of a bottle including a handle, a housing having one end connected to said handle and an opening in the opposite end thereof, a plunger telescoped into said housing, means connected with said plunger for sliding the plunger axially within said housing from a normally retracted position into an advanced position, a plurality of die segments disposed within said housing around said plunger for pivotal movement between open and closed positions relative to said plunger, means for connecting the upper end portions of said segments pivotally and slidably with said plunger and means for closing said segments around

said plunger prior to said plunger sliding relative to said segments so that said segments are carried in an axial direction with said plunger and are pivoted closed around said plunger as the latter initially is moved from its retracted position toward its advanced position with said plunger thereafter sliding axially with respect to said segments so as to crimp the cap on the top of the bottle as said plunger reaches its advanced position.

3,998,033
CLOVERLEAF BITLESS BRIDLE

L. Dale Watkins, 1015 Indiana Ave., Salt Lake City, Utah 84104, and Lyman M. Watkins, 192 N. 6th East, Heber City, Utah 84032

Filed Mar. 6, 1975, Ser. No. 555,976
Int. Cl.² B68C *1/04*
U.S. Cl. 54—6 R **6 Claims**



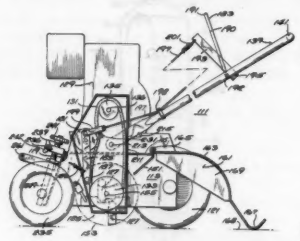
1. A bitless bridle for horses comprising in combination
a. a rigid sidepiece consisting of a shaft, one end having a single eyelet extending longitudinally therefrom and the other end of the shaft having three eyelets in cloverleaf configuration, the end cloverleaf eyelet extending longitudinally therefrom and the other two cloverleaf eyelets being slightly offset and oppositely extending from each other along the shaft perpendicular to and in the same plane as the end eyelet;
b. supporting headgear comprising a headstall having a throatlatch and a band extending from the top of the horses head behind the ears and terminating in cheekstraps, the ends of which are connected to the end cloverleaf eyelet;
c. a noseband attached at each end to the perpendicularly extending cloverleaf eyelet closest the end cloverleaf eyelet;
d. a chinband attached at each end to the oppositely extending cloverleaf eyelet;
e. reins attached to the single eyelet at the end of the shaft opposite the cloverleaf eyelets;
f. an adjustable centerpiece interconnecting said noseband and headstall.

3,998,034
POWER RAKE

Robert M. Rubin, Lincoln, Nebr., assignor to Outboard Marine Corporation, Waukegan, Ill.

Division of Ser. No. 505,559, Sept. 13, 1974. This application June 12, 1975, Ser. No. 586,297
Int. Cl.² A01D *35/24*
U.S. Cl. 56—11.3 **1 Claim**

1. A power rake comprising a housing supported by wheel means for travel over the ground, a handle extending from said housing and including a portion adapted to be gripped by an operator to propel and guide the rake over the ground, a reel including a plurality of cutting blades, means on said housing mounting said reel for rotation of said cutting blades in respective vertical paths, a power source on said housing, clutch means for selectively transmitting power from said power source to said reel for rotation thereof, said clutch means including an endless element operatively connected to said power source and to said reel and a member supporting an idler and movable relative to a position providing power transmission between said power source and said reel, said idler being operative, when said member is in said power transmitting position, to engage the outside surface of said endless element so as to remove slack from said endless element so as to cause power transmission thereby, a brake fixed relative to said member for movement, in common with said member, to a position in braking engagement with the inside surface of said endless element when said member is moved from said power transmitting position, means biasing said

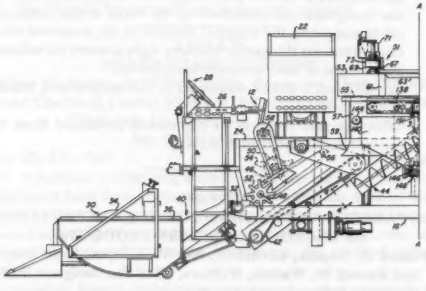


member away from said power transmitting position, a control mounted on said handle for movement relative to a position adjacent to said handle portion, and a linkage connecting said control and said member so as to retain said member in said power transmitting position against the action of said biasing means when said control is retained in said position adjacent to said handle portion and to permit movement of said member away from said power transmitting position, movement of said brake to said position of braking engagement, and movement of said control away from said handle portion in response to action of said biasing means when said control is not held in adjacent relation to said handle portion.

3,998,035
POD COMBINE

Arthur L. Towson, Jr., Lewiston, N.Y., assignor to Chisholm-Ryder Company, Inc., Niagara Falls, N.Y.

Filed May 16, 1975, Ser. No. 578,089
Int. Cl.² A01D *45/24*
U.S. Cl. 56—13.5 **10 Claims**



1. In a pod combine for harvesting the edible product of leguminous plants comprising,
a mobile frame,
a harvester and thresher mounted in tandem on said mobile frame, said thresher including a rotatable reel portion having an inlet end portion,
said harvester operable to remove the unopened pods, a portion of the foliage and vines from the plant, said

thresher operable to open said pods and remove the product therefrom and separate said product from substantially all of said pods, vines and foliage,

feed means positioned on said frame between said harvester and said thresher for feeding the material harvester by harvester into said thresher rotatable reel portion,

a segregating assembly including cluster breaking means and suction means positioned rearwardly of said harvester and in overlying relation with said feed means on said frame for breaking up clusters of said foliage and said product and separating a substantial portion of said foliage from said product before said product and the remaining portion of said foliage is introduced into said thresher rotatable reel portion.

separator means for separating a minor portion of said foliage discharged from said rotatable reel from said product removed from said pods by said thresher, said separator means positioned on said frame in material receiving relation with said rotatable reel to receive a minor portion of said foliage and said product discharged from said rotatable reel after said thresher has removed the product from the pods,

first conveying means positioned longitudinally beneath said rotatable reel for conveying said product and said minor portion of said foliage discharged through said rotatable reel to said separator means, and

second conveying means for conveying said product from said separator means to a storage means.

3,998,036

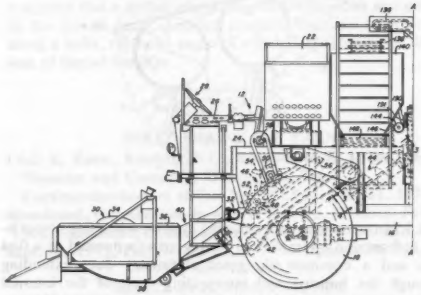
POD COMBINE

Virgil N. Jarrell, Viola, Del., assignor to Chisholm-Ryder Company, Inc., Niagara Falls, N.Y.

Filed June 7, 1974, Ser. No. 477,202

Int. Cl.² A01D *45/24*

U.S. Cl. 56—13.5 **13 Claims**



1. In a pod combine for harvesting the edible product of leguminous plants comprising,

a mobile frame,

a harvester and thresher mounted in tandem on said mobile frame, said thresher having an inlet end portion,

said harvester operable to remove the unopened pods, a portion of the foliage and vines from the plants, said thresher operable to open said pods and remove the product therefrom and separate said product from substantially all of said pods, vines and foliage.

feed means positioned on said frame between said harvester and said thresher for feeding the material harvested by said harvester into said thresher inlet end portion,

an endless belt conveyor operable to convey said material harvested by said harvester to said feed means, said endless belt conveyor having a transverse dimension substantially greater than the diameter of said thresher inlet end portion,

said feed means including a pair of screw type conveyors extending longitudinally between said harvester and said thresher inlet portion, said pair of screw type conveyors being operable to transport the harvester material at a speed greater than said endless belt conveyor to prevent an accumulation of the material at said thresher inlet portion,

separator means for separating a minor portion of said foliage discharged from said thresher from said product removed from said pods by said thresher, said separator means positioned on said frame in material receiving relation with said thresher to receive a minor portion of said foliage and said product discharged from said thresher after said thresher has removed the product from the pods,

first conveying means positioned longitudinally beneath said thresher on said frame for conveying said product and a minor portion of said foliage discharged from said thresher to said separator means,

product distributor means rotatably positioned adjacent the discharge end of said first conveying means for evenly distributing a minor portion of said foliage and said product discharged from said first conveying means in a curtain of material into the path of said separator means,

second conveying means positioned on said frame in material receiving relation with said separator means to convey said product from said separator means to a storage means.

3,998,037

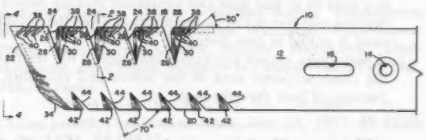
MEANS FOR MULCHING LEAVES AND THE LIKE

John N. Deans, 67 E. Central Ave., and Eugene B. Woodhull, 61 E. Central Ave., both of Wharton, N.J. 07885

Filed Dec. 18, 1975, Ser. No. 642,139

Int. Cl.² A01D *55/18*

U.S. Cl. 56—295 **15 Claims**



1. Means for mulching leaves and the like, comprising:

an elongate element having a substantially flat surface, and shaft-receiving means for coupling thereof, in an attitude normal to said surface, to a power shaft of a rotary prime mover for effecting powered rotation of said element;

said element further having leading and trailing edges, relative to its rotary direction, defining thereof lateral terminations of said surface;

said leading edge being discontinuous, having portions thereof relieved by cut-outs;

said cut-outs being bounded on one side, at least, by teeth; wherein

said teeth have arcuate bases integral with said element, and terminal tips, integral with said bases, said tips being disposed substantially normal to said surface; and wherein

said cut-outs, in plan, are generally of triangular configuration in which the bases of said cut-outs are formed in said leading edge.

3,998,038

FRUIT PICKER

Arthur A. Root, 2972 Solar Lane, Rte. 1, San Marcos, Calif. 92069

Filed Sept. 2, 1975, Ser. No. 609,587

Int. Cl.² A01D *46/24*

U.S. Cl. 56—336 **2 Claims**

1. In a fruit picker apparatus having an elongated pole with a fruit stem cutter mounted on one end thereof and cutter

actuating means extending to the other end, the improvement comprising:

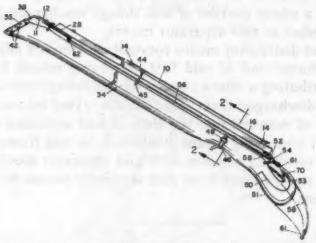
an elongated sleeve of compliant material attached coextensively to the pole;

one end of said sleeve having an open mouth adjacent said cutter to receive fruit severed by the cutter;

said sleeve having a fruit receiving pocket at the other end of the pole, said pocket having a flap extending from the sleeve;

actuating means for selectively holding the flap in return folded position over the end of the sleeve to close the pocket, and extending the flap to open the pocket;

said actuating means including an endless actuating cord



adjustably mounted on the pole and extending substantially the full length thereof for access from any position along the pole, and a connector connecting said flap to said actuating cord;

a collar mounted on said other end of the pole adjacent said pocket, said collar having a hole through which said actuating cord and said connector pass together, said connector having an enlarged plug portion thereon which is a tight fit in said hole and comprises locking means for holding said flap in the closed position when the actuating cord is pulled in one direction;

and restricting means encircling said sleeve for restricting the cross sectional area of the sleeve and retarding the passage of fruit therethrough.

3,998,039

METHOD AND APPARATUS FOR OPEN-END SPINNING

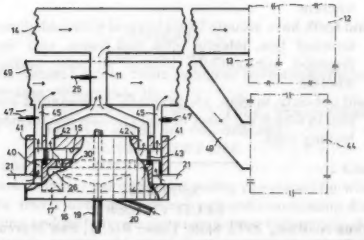
Joachim Fürstenberg, Aichelberg, Germany, assignor to LTG Lufttechnische GmbH, Stuttgart, Germany

Filed Dec. 7, 1971, Ser. No. 205,679

Claims priority, application Germany, Dec. 9, 1970, 2060654

Int. Cl.² D01H 1/12

U.S. Cl. 57—58.95 **15 Claims**



4. In an apparatus for open-end spinning, comprising: a housing; a spinning chamber defined within the housing; a power driven rotor within the chamber; a feeder channel for feeding discrete fibers to the interior of the rotor by means of a current of air; a fiber receiving groove in the interior of the rotor; a thread evacuation channel for conducting twisted fibers as a thread from the fiber groove out of the spinning chamber; and at least one air passage in the rotor connecting the interior of the rotor with an adjoining area of the spinning chamber; the chamber having at least one air outlet opening, the improvement wherein the at least one air outlet opening, through which air flowing into the interior of the rotor leaves the spinning chamber, is connected to an air suction device by at least one air channel, wherein the wall of the spinning chamber defined by the housing is provided with at least one bypass inlet opening, and wherein the rotor is provided on the outside of one of its walls with scoops in the path of the air flowing from the at least one bypass inlet opening, whereby said air exerts a torque on the rotor in the direction of its rotation.

3,998,040

METHOD OF AND APPARATUS FOR SPINNING YARNS FROM STAPLE FIBERS BY AN OPEN-END SPINNING TECHNIQUE

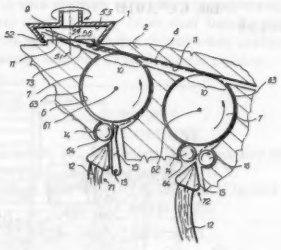
Josef Ripka; Vladimir Ohlidal, both of Usti nad Orlici; Václav Vobornik, Letohrad; Jan Junek, Usti nad Orlici; František Hortlik, Usti nad Orlici; František Jaroš, Usti nad Orlici; Karel Mareš, Usti nad Orlici; Pavel Celerin, Usti nad Orlici; Zdeněk Kotrba, Usti nad Orlici; Marie Brožková, Usti nad Orlici, and Ludmila Lihtarová, Usti nad Orlici, all of Czechoslovakia, assignors to Vyzkumny Ustav Bavlnarsky, Usti nad Orlici, Czechoslovakia

Filed Mar. 31, 1975, Ser. No. 563,294

Claims priority, application Czechoslovakia, Apr. 3, 1974, 2382/74; Apr. 3, 1974, 2383/74; Apr. 3, 1974, 2385/74

Int. Cl.² D01H 1/12

U.S. Cl. 57—58.95 **15 Claims**



1. In an open-end yarn spinning system, a housing comprising at least one internal bore having an axis parallel to a first axis and a common elongated stationary duct extending through the housing and intersecting each of the internal bores upstream of a first end of the duct, the regions of intersection of the duct and each bore defining a fiber-stripping zone, a combing cylinder mounted coaxially in each internal bore, the annular spaces between the periphery of each combing cylinder and the surrounding wall of the associated bore defining a fiber-separating zone whereby fiber slivers introduced into the separating zone are separated by action of the combing cylinder and separated fibers are discharged via the stripping zone into the duct to flow as a common interengaging fiber flow directly downstream in the duct toward the first end of the duct without substantial further separation when the associated combing cylinder is rotated and to effect the joining of flows of separated fibers from the first and second slivers into a common interengaging downstream flow in the portion of the duct between the fiber-stripping zone and the first end of the duct, yarn spinning means disposed at the first end of the duct for receiving said interengaging fiber flow of separated fibers discharged into the duct and flowing toward the first end, the spinning means being mounted for rotation about a second axis which is skewed relative to said first axis,

and means for introducing first and second fiber slivers into spaced portions of the fiber-separating zone.

3,998,041

FALSE TWIST DEVICE AND METHOD OF PRODUCING A TEXTURED YARN OR THE LIKE

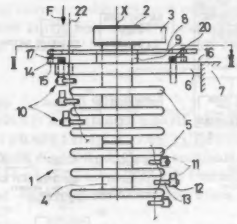
Felix Graf; Jakob Fluck, and Hans Schellenberg, all of Winterthur, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Mar. 1, 1976, Ser. No. 662,978

Claims priority, application Switzerland, Sept. 26, 1975, 12550/75

Int. Cl.² D02G *1/04*; D01H *7/92*

U.S. Cl. 57—77.4 **10 Claims**



2. A false twist device comprising a number of friction disks, means for coaxially arranging said friction disks in spaced relationship from one another to define between each two neighboring friction disks a space, thread guide elements arranged helically distributed along the circumference of the false twist device, said thread guide elements extending into the spaces between the friction disks along a helical configuration about the circumference of the false twist device in such a manner that a thread contacting the friction disk and guided by the thread guide elements contacts the false twist device along a helix, the helix angle of which decreases in the direction of thread transfer.

3,998,042

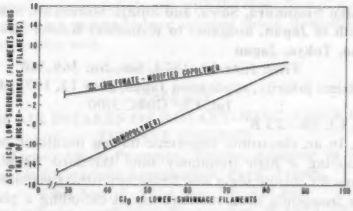
MIXED SHRINKAGE YARN

Cecil E. Reese, Kinston, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 551,963, Feb. 21, 1975, abandoned, Continuation-in-part of Ser. No. 439,643, Feb. 4, 1974, abandoned, Continuation-in-part of Ser. No. 292,300, Sept. 26, 1972, Pat. No. 3,927,167. This application Dec. 15, 1975, Ser. No. 640,775

Int. Cl.² D02G *3/24*, *1/18*, *3/02*

U.S. Cl. 57—140 BY **6 Claims**



1. A mixed-shrinkage polyester yarn composed of 25 to 75 percent low-shrinkage filaments and 75 to 25 percent higher-shrinkage filaments having a degree of filament intermingling between 65 and 100 percent; the low-shrinking filaments consisting of a polymer of about 97 to 100 mole percent ethylene terephthalate structural units and about 3 to 0 mole percent of polymer structural units which contain sulfonate groups as pendant parts of repeating units in the polymer chain, having a crystallinity index (CL_L) of about 35 to about 80 percent and a relative viscosity of about 14 to 19; the higher-shrinkage filaments consisting of a polymer of about 85 to 95 mole percent ethylene terephthalate structural units and 15 to 5 mole percent of other ester units forming a copolyester therewith, having a relative viscosity of 28 to 40 and a crystallinity index (CI_H) such that CI_L minus CI_H is equal to or greater than the value obtained by the formula $(0.39\text{-}0.13M)$ $CI_L - 26.1 + 11.3M$ wherein M is the mole percent of said sulfonate-containing polymer structural units in the low-shrinking filaments; the filaments of the yarn being free from undrawn segments and having break elongations within a range of 15 percent units.

6. A mixed-shrinkage polyester yarn composed of 25 to 75 percent low-shrinkage filaments and 75 to 25 percent higher-shrinkage filaments having a degree of filament intermingling between 80 and 100 percent; the low-shrinking filaments consisting of a polymer of 95 to 100 mole percent ethylene terephthalate structural units and 5 to 0 mole percent ethylene 5-(alkali metal sulfo)isophthalate structural units, having a relative viscosity of about 14 to 19 and a density of at least 1.3800; and the higher-shrinkage filaments consisting of a different polyester of 85 to 95 mole percent ethylene terephthalate structural units and 15 to 5 mole percent of other ester units to retard crystallization, having a relative viscosity of about 28 to 40, a density of less than 1.3840, a boil-off shrinkage greater than 7.5 percent and a break elongation within 15 percentage units of the low-shrinkage filaments.

3,998,043

ELECTRIC TIMEPIECE FOR DISPLAYING THE OPERATING CONDITION THEREOF

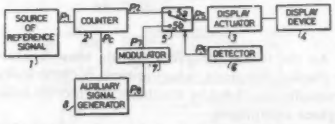
Munetaka Tamaru, Tokyo; Kazunari Kume, Tokorozawa; Hideshi Oono, Sayama; Minoru Watanabe, Tokorozawa; Hideo Sato, Sayama, and Shigeru Morokawa, Higashiyamato, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1974, Ser. No. 526,980

Claims priority, application Japan, Dec. 26, 1973, 49-3258; Feb. 26, 1974, 49-22537

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **6 Claims**



1. In an electronic timepiece, wnich includes a battery means for producing a voltage of a predetermined level to drive a customary time display and associated circuitry for transmitting power at a predetermined frequency from the battery means to the customary display, wherein the associated circuitry includes:

a reference signal source for producing a divisible signal to drive the customary time display;

a counter for dividing the signal produced by the reference signal source, and for producing the signal of a predetermined frequency to drive said customary time display;

an auxiliary signal generator driven by the counter and having an output signal of a first frequency, different from the predetermined frequency;

a modulator including a frequency divider and a logic circuit, wherein said modulator has first and second inputs from the counter and an input from the auxiliary generator, wherein the first input from the counter is applied

through the frequency divider, then to the logic circuit; wherein the second input from the counter is applied to the logic circuit; and wherein the input from the auxiliary signal generator is applied to the logic circuit; wherein the logic circuit generates a signal of a second frequency different from said first frequency;

detecting means for detecting, when the battery means produces a low voltage below said predetermined level, and for producing an alarm signal upon detecting said low voltage; and

signal transfer means activated in response to said alarm signal for selecting whether the signal having the predetermined frequency, or the signal having the second frequency will be applied to the display.

3,998,044

ELECTRONIC TIMEPIECE

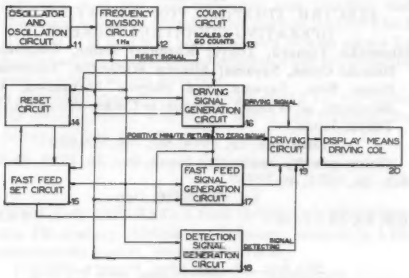
Masamichi Yamauchi, Ichikawa; Yasuaki Nakayama, Higashikurume; Mitsuo Ooka, Tokorozawa, and Hiroharu Ohtsuka, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 18, 1974, Ser. No. 534,067

Claims priority, application Japan, Dec. 19, 1973, 48-142653; Dec. 19, 1973, 48-142654; Dec. 20, 1973, 48-141798; Jan. 23, 1974, 49-9922; Mar. 4, 1974, 49-24929; Mar. 22, 1974, 49-31503; Mar. 25, 1974, 49-33228; Apr. 9, 1974, 49-40150; July 1, 1974, 49-75124; Dec. 19, 1973, 48-14592[U]; Feb. 23, 1974, 49-21927[U]; Mar. 12, 1974, 49-29034[U]; Apr. 24, 1974, 49-46624[U]; May 21, 1974, 49-57768[U]

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **19 Claims**



1. An electronic timepiece having time measurement and time display functions, wherein time is electrically measured and visually displayed by mechanically moved indicators, said timepiece comprising:

an electromechanical transducer for converting electrical pulses into a mechanical force;

a reference oscillator for converting an electrically excited mechanical oscillation to a train of electrical pulses;

a frequency division circuit for dividing the frequency of said electrical pulses of said reference oscillator;

a driving circuit for receiving the output pulse from said frequency division circuit and applying driving pulses to said electromechanical transducer to produce said mechanical force;

a reduction gear train, driven by the force of said electromechanical transducer and driving said mechanically moved indicators;

a detection signal generation circuit for generating a detection signal wherein said detection signal is a repetition pulse with a frequency and pulse width to which said electromechanical transducer cannot respond to drive said reduction gear train; and

means associated with said drive circuit for combining said driving pulses and said detection signal to transmit a combined signal to said electromechanical transducer wherein said driving pulse drives the transducer, while the detection signal generates a time measuring signal to which said transducer does not respond thereby permitting operational separation of said time measuring and time displaying functions.

3,998,045

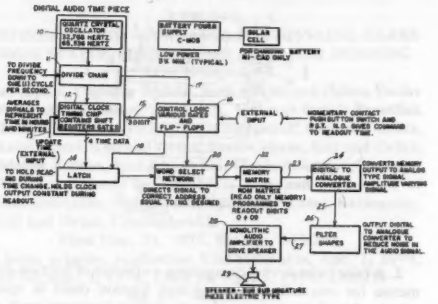
TALKING SOLID STATE TIMEPIECE

Robert W. Lester, Manhasset, N.Y., assignor to Camin Industries Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 584,874

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **4 Claims**



1. A timepiece comprising:

first means for generating time based signals,

logic means coupled to said first means and being responsive to said time signals for selecting the proper combinations of said time signals which correspondingly indicate correct present time and for providing sequential outputs with intervals thereinbetween representing the proper combinations of said time signals,

solid-state memory means having coded information command signals representing combinations of necessary verbal audio time phrases which correspond to said time signals,

word selecting means interconnected to said logic and memory means and being responsive to said outputs of said logic means for directing said outputs of time base signals to proper locations in same memory means to thereby actuate said command signals representing verbal time phrases corresponding to the present time, and

converting means coupled to said memory means for converting said command signals to signals which enable verbal readout.

3,998,046

ELECTRONIC TIMEPIECE

Izuhiko Nishimura, Suwa, and Shinju Morozumi, Shimosuwa, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed June 12, 1973, Ser. No. 369,340

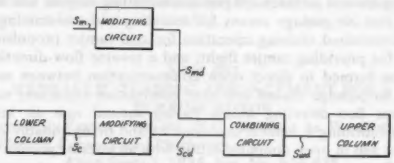
Claims priority, application Japan, June 12, 1972, 47-58477

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **10 Claims**

1. In an electronic timepiece having oscillator means for producing a high frequency time standard signal, divider means for producing a low frequency timing signal from said high frequency time standard signal including a plurality of series-connected divider stages, and means associated with certain of the divider stages for the digital display of time in response to said timing signals produced by the associated divider stages, the improvement which comprises means for selectively applying a correction signal, and means for correcting one of said certain divider stages in response to said

selectively applied correction signal comprising combining circuit means in series connection between the divider stage to be corrected and the next-previous divider stage for receiving the carry signal of said next-previous divider stage and said



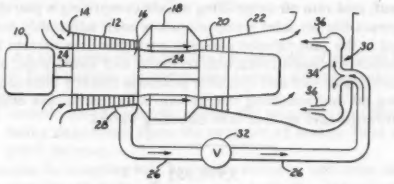
selectively applied correction signal and for applying as an input to the divider stage to be corrected, a combined signal including a pulse corresponding to each pulse and each of said carry signals and correction signal wherein said combining circuit means is an EXCLUSIVE OR circuit element.

3,998,047

METHOD AND APPARATUS FOR PREVENTING OVERSPEED IN A GAS TURBINE

William E. Walker, San Diego, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 18, 1975, Ser. No. 569,351
Int. Cl.² F02C 9/14
U.S. Cl. 60—39.03 **8 Claims**



1. A method of preventing overspeed in a gas turbine in response to a rapid decrease in the load applied thereto, the input of said gas turbine being operably associated with a compressor, a main flow of gas passing through said compressor and turbine, the method comprising the steps of:

diverting from the main flow of gas a stream of gas from the exit of said compressor;

bypassing said turbine input with said diverted stream;

injecting said diverted stream downstream of the turbine exit; and,

directing said injected stream upstream toward said turbine exit to thereby reduce the flow of gas through the turbine and minimize overspeed therein, while mixing the bypassed and injected stream with the main flow of gas from the turbine exit to reduce thermal shock downstream of the turbine exit.

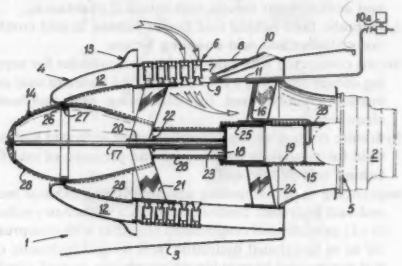
3,998,048

RAM AIR INTAKES OF ROTARY-WING AIRCRAFT TURBINE ENGINES

Anicet Derue, Aix-en-Provence, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Nov. 7, 1974, Ser. No. 521,660
Claims priority, application France, Nov. 9, 1973, 73.39884
Int. Cl.² F02C 7/04
U.S. Cl. 60—39.09 P **5 Claims**

1. Air intake apparatus for a turbine engine of an aircraft particularly for a helicopter comprising in combination an inlet duct formed of an annular hollow housing having exterior and interior walls forming an opening at the forward end and flaring divergently outward toward the rear end, a streamlined bullet located within said duct, a thrust mechanism located within said duct for axially moving said bullet into and out of sealing position in said central opening, said thrust mechanism being supported on a plurality of radial struts secured to the interior wall of said duct and partially blocking said duct, a plurality of inertial particle separators radially aligned between the exterior and interior walls of said housing intermediate the forward and rear ends thereof, each of said separators having an inlet in the external wall of said housing for free



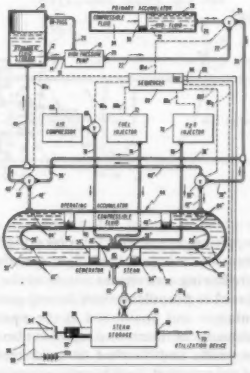
communication with external air, a first outlet in said interior wall for communication with said duct and a second outlet communicating into the space between the external and internal walls of said housing for the accumulation of particles therein, said inlet and first outlet of said separator being constantly open to provide free flow of air into said duct, at least one channel extending rearwardly from the space between said external and internal walls of said housing and opening in the exterior wall of said housing for the discharge of said particles, and deflector elements stationarily positioned externally about said duct upstream of said separator to disturb the flow of said external air reaching the inlet of said separators.

3,998,049

STEAM GENERATING APPARATUS

Roe L. McKinley; Jack M. McKinley, both of Longview, Tex., and Martin Kirsch, Jr., Shreveport, La., assignors to G & K Development Co., Inc., Shreveport, La.

Filed Sept. 30, 1975, Ser. No. 618,051
Int. Cl.² F02B 71/00, 71/06
U.S. Cl. 60—39.55 **10 Claims**



1. Steam generating apparatus, comprising:

a combustion cylinder;

a pair of opposed power pistons movable inwardly and outwardly in said combustion cylinder, the space therebetween defining a combustion chamber of said apparatus;

accumulator means containing a compressible fluid for accumulating a pressure charge;

means coupling said accumulator means with the ends of said combustion cylinder, said coupling means defining an unrestricted and continuously open fluid flow path having throughout its length a cross-sectional area substantially equal to that of said combustion cylinder for transfer of fluid between said combustion cylinder and said accumulator means with minimal resistance;

a hydraulic fluid behind said power pistons in said combustion cylinder and said coupling means;

means connected with said combustion cylinder for supplying compressed air, a fuel charge, and water to said combustion chamber and for exhausting said combustion chamber;

hydraulic control means communicating with said hydraulic fluid for regulating the amount and pressure of said fluid behind said piston; and

sequencing means actuating said supply and exhaust means and said hydraulic control means in a sequence cyclically to (1) provide said combustion chamber with compressed air so as to exhaust hydraulic fluid to said hydraulic control means and to provide an air charge in said combustion chamber, (2) supply hydraulic fluid under pressure against said power pistons to compress and heat said air charge, (3) admit a fuel charge to said combustion cylinder to ignite said fuel and drive the pistons outwardly, (4) inject water into the ignited fuel charge to vaporize the water into steam thereby increasing pressure driving said power pistons outwardly, said outward movement driving said hydraulic fluid into said accumulator means to compress the fluid therein, and (5) exhaust steam and gases when said power pistons reach the end of their stroke, the compressed fluid in said accumulator means causing said hydraulic fluid to flow through said coupling means to move said power pistons inwardly exhausting said steam and gases.

3,998,050

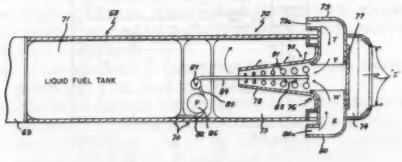
REVERSE FLOW AFT INLET RAMJET SYSTEM

Edward T. Curran, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 431,180, Jan. 7, 1974, abandoned. This application Mar. 11, 1975, Ser. No. 557,570

Int. Cl.² F02K *9/02, 7/10*

U.S. Cl. 60—245 **2 Claims**



1. A jet propulsion apparatus for powering a missile or aircraft at supersonic or hypersonic flight speeds comprising: a main enclosure having an exhaust nozzle at the downstream end thereof; a rocket propulsion unit incorporating a rocket fuel supply container and positioned at the upstream end of said main enclosure; at least one combustion chamber in communication with, and located in said main enclosure downstream of said rocket fuel supply container; a ramjet propulsion unit incorporating said combustion chamber and including ram air-passage means disposed in recessed relation within the walls of said main enclosure upstream of said exhaust nozzle and at the downstream end of said combustion chamber; adjustably positioned ram air-controlling means built into said ram air-passage means and incorporating first, upstream-facing ram air-inlet means movable between a retracted position in a recessed, compact relation in said main enclosure and an extended position admitting ram air into the said ram air-passage means for initiating and maintaining a predetermined cruising operation for said ramjet propulsion unit for providing ramjet flight; and a reverse flow-directing means formed in direct open communication between said ram air-passage means and said combustion chamber; said reverse flow-directing means having second ram air inlet means forming a natural extension of and being slidably engaged and in open communication with an interior portion of said first ram air inlet means and containing a main air egress opening in an upstream location and a plurality of peripheral auxiliary air egress openings all communicating with said combustion chamber; said fuel supply container incorporating a liquid fuel, and said main enclosure further having an intermediate, completely wall-enclosed compartment between said liquid fuel container and said combustion chamber automatically blocking the reverse ram air egressing from said main egress opening and simultaneously returning the said air flow in a downstream direction, said compartment housing a fuel pump; valve control means; and first and second fuel feed lines respectively interconnected with the liquid fuel container for selectively feeding a supply of liquid fuel in a downstream direction into a fuel injection manifold having a first manifold line section in fluid communication with said valve control means and a second manifold line section integrally formed with said first line section and extending into said combustion chamber and the interior of said reverse flow-directing means in open communicaton with the said auxiliary egress openings thereof; said ram air-controlling means comprising a plurality of retractable air inlet scoop elements each adjustably positioned in the ram air-inlet passages corresponding thereto for movement between retracted, recessed and inoperable, and extended, pop-out and operable positions thereby alternately closing off and admitting ram air into said combustion chamber through said reverse flow-directing means.

3,998,051

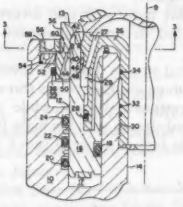
SUSTAINER-INJECTOR SLOT-ALIGNMENT

Walter E. Ziegler, Santa Monica, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 2, 1975, Ser. No. 538,051

Int. Cl.² F02K *9/02;* **B05B** *7/06*

U.S. Cl. 60—258 **6 Claims**



1. A sustainer-injector comprising a housing having a bore therethrough and a cavity therein at an end thereof and coaxially of said bore, a cylindrical pintle member slidably mounted as a piston in a portion of said cavity, a core assembly secured in said bore of said housing and slidably and sealably mounted at an inner surface of said pintle member, an oxidizer ring slidably mounted at an inner surface to an outer surface of said pintle member and secured to seal said cavity of said housing structure at an outer surface of said oxidizer ring, means keying said core assembly and said oxidizer ring in

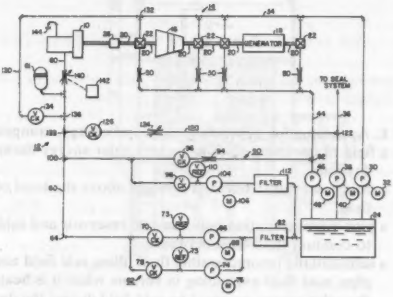
a predetermined relationship relative to said pintle member for linear movement of said oxidizer ring relative to said core assembly and said pintle member, and adjusting means mounting said oxidizer ring in said housing for linear adjustment relative to said housing and said pintle member to allow said oxidizer ring to be adjusted linearly relative to said pintle member and said core assembly.

3,998,052

HYDRAULIC TURNING ARRANGEMENT FOR A TURBINE ROTOR

Michael J. Easter, Pineville, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 3, 1975, Ser. No. 610,038
Int. Cl.² F15B *1/02, 13/09*
U.S. Cl. 60—413 **16 Claims**



1. An arrangement for turning a rotor shaft of an axial flow elastic fluid turbine apparatus, said turning arrangement comprising:

a variable speed hydraulic motor, the torque output thereof being dependent upon the pressure of motive fluid supplied thereto;

means for coupling said hydraulic motor to said rotor shaft;

a plurality of motive fluid sources in fluid communication with said motor, each source having a predetermined pressure range and flow rate associated therewith;

a supply header connected to said hydraulic motor and to each of said sources of motive fluid, said supply header having an accumulator therein;

a variable flow constrictor disposed within said supply header, said flow constrictor adapted to alter the pressure and flow rate of motive fluid within said supply header from each of said sources of motive fluid; and

flow control means for selectively permitting communication between said plurality of motive fluid sources and the hydraulic motor to thereby introduce motive fluid at a predetermined pressure and flow rate to said motor to produce predetermined torque outputs therefrom.

3,998,053

THREE-PUMP - THREE-CIRCUIT FLUID SYSTEM OF A WORK VEHICLE HAVING CONTROLLED FLUID-COMBINING MEANS

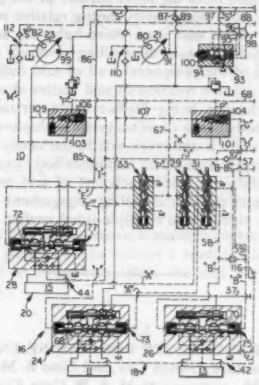
Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 15, 1976, Ser. No. 667,227
Int. Cl.² F15B *13/06, 13/09*
U.S. Cl. 60—422 **12 Claims**

1. In a fluid system of work elements of a work vehicle having a pilot pump and first, second, and third fluid circuits, each fluid circuit having a fluid pump connected to a work element through a control valve assembly for controlling the flow of fluid from each pump to its respective work element and a primary pilot control valve positioned between the pilot pump and the control valve assembly for altering a pilot pump signal P and delivering resultant signals, the improvement comprising:

fluid control means for controllably passing fluid between the first and second fluid circuits in response to resultant signal from a pilot control valve of each first and second circuit;

signal means for sensing the load pressure of each respective circuit and delivering respective control signals;



pump control means for controlling the respective pumps in response to the respective control signals;

signal resolving means for sensing the control signals of the first and second circuits and controlling the operation of the third fluid pump in response to the larger of said sensed signals; and

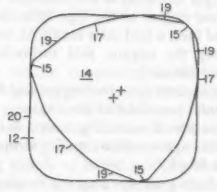
means for controllably passing fluid from the third fluid pump into at least one of the first and second circuits in response to said resultant signal.

3,998,054

ROTARY MECHANISM WITH IMPROVED VOLUME DISPLACEMENT CHARACTERISTICS

Bruce G. Whitestone, 1229 Mesquite Trail, Benbrook, Tex. 76126

Filed Apr. 16, 1975, Ser. No. 568,433
Int. Cl.² F01C *1/02;* **F03C** *3/00*
U.S. Cl. 60—517 **43 Claims**



1. A rotary mechanism for pumps, fluid motors, heat engines or the like; said mechanism comprising an outer body having a cavity and an inner body received within said outer body cavity for relative rotation therein with the axis of the inner body being laterally spaced from but parallel to the axis of the outer body cavity,

said inner body having an outer surface basically composed in cross-section of (i) a plurality of apex portions equally spaced about and equidistant from the axis of the inner body, (ii) a plurality of median portions equally spaced about and equidistant from the axis of the inner body, each median portion being positioned between and

spaced apart from two said apex portions, and (iii) a plurality of connecting portions, each said median portion being joined to each of its adjacent apex portions by a connecting portion,

each said apex portion being in continuous sealing engagement with the inner surface of the peripheral wall of said outer body cavity during relative rotation of said bodies about said axes, each said median portion periodically being in sealing engagement with and periodically being disengaged from the inner surface of the peripheral wall of said outer body cavity during relative rotation of said bodies about said axes, there being no sealing engagement between said connecting portions and the inner surface of the peripheral wall of said outer body cavity during relative rotation of said bodies about said axes,

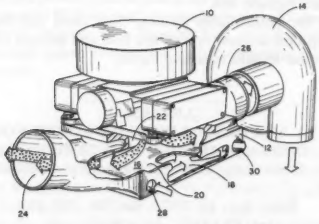
said mechanism being further characterized in that said outer body has in cross section a multiple-sided profile in which there is one more side to the cavity than the number of apex portions on said inner body and in that during said relative rotation each one of said median portions undergoes periodical sealing engagement with each successive side of said multiple-sided profile.

3,998,055

TURBOCHARGER FOR MARINE ENGINES

John O. Bradford, Gibson City, and Elmo R. Meiners, Anchor, both of Ill., assignors to M & W Gear Company, Gibson City, Ill.

Filed Apr. 3, 1975, Ser. No. 564,778
Int. Cl.² F02B 29/04
U.S. Cl. 60—599 **5 Claims**



1. A turbocharger assembly in combination with an internal combustion marine engine of the type including a carburetor for mixing air and fuel, a fuel inlet manifold, and fluid cooling means for cooling the engine, said turbocharger assembly comprising, in combination:

a turbocharger mounted on the engine and having an outlet to the fuel inlet manifold of the engine;

a dual chamber block including means for mounting said block on said engine and means for mounting the carburetor on the block,

said block including an opening for receipt of an air fuel mixture from the carburetor mounted thereon, said opening in communication with a first chamber within said block, an outlet from said first chamber for connection to the inlet of the turbocharger;

a second chamber in the block adjacent said first chamber and separated therefrom by a heat transfer wall;

at least one fluid inlet and one fluid outlet from said second chamber; and

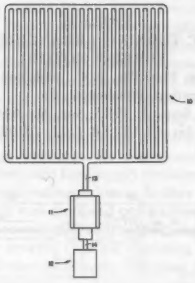
fluid connection means for connecting the fluid inlet and outlet to the flow of fluid in the fluid cooling means of said engine whereby said air-fuel mixture within said first chamber is heated and vaporized continuously by heat transferred from fluid flowing through said second chamber.

3,998,056

SOLAR ENERGY APPARATUS AND METHOD

Robert O. Clark, 1921 Truman NE., Albuquerque, N. Mex. 87110

Filed Feb. 26, 1975, Ser. No. 553,267
Int. Cl.² F03G 7/02
U.S. Cl. 60—641 **1 Claim**



1. Apparatus for generating electrical energy, comprising:

a field of enclosed pipes to receive solar energy during the daytime,

a fluid reservoir, located at a height above the level of said field,

a pipe communicating between said reservoir and said field to conduct fluid therebetween,

a substantially incompressible fluid filling said field and said pipe, said fluid expanding in volume when it is heated by the solar energy received by said field during the daytime to flow from said field to said reservoir through said pipe, and contracting in volume when heat is lost therefrom during the nighttime to flow from said reservoir into said field through said pipe,

a fluid turbine,

valve means interconnecting said pipe and said turbine for directing said fluid flow in said pipe through said turbine in a single direction to drive said turbine during the expansion and contraction of the volume of said fluid,

and an electrical energy generator coupled to said turbine.

3,998,057

NUCLEAR POWERPLANT WITH CLOSED GAS-COOLING CIRCUIT

Dirk Haferkamp; Alija Hodzic, both of Mannheim, and Ulrich Winter, Heidelberg, all of Germany, assignors to Hochtemperatur-Reactorbau GmbH, Cologne, Germany

Filed Jan. 31, 1975, Ser. No. 545,899
Claims priority, application Germany, Feb. 1, 1974, 2404843
Int. Cl.² G21C 15/02
U.S. Cl. 60—644 **22 Claims**

1. A nuclear power plant, comprising:

a. an inner, generally cylindrical pressure vessel;

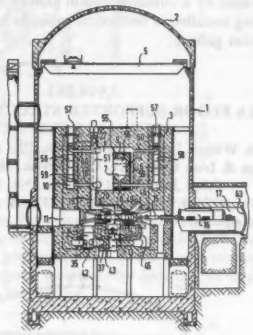
b. a high-temperature reactor contained within a generally centrally oriented cavity within said inner vessel;

c. a gas tubine assembly located in a horizontally oriented chamber positioned in said inner vessel beneath said reactor;

d. a plurality of heat exchanger means positioned in a plurality of vertically oriented pods spaced radially about said reactor in the wall of said inner vessel, there being a plurality of first such heat exchanger means and at least one second heat exchanger means;

e. a plurality of hot gas conduit means interconnecting said reactor and said turbine assembly, each of said hot gas conduit means including a horizontal connection to said reactor and to said turbine and a vertical section between said connections;

f. a combined turbine exhaust gas distribution/cooled gas collection system horizontally positioned in the bottom wall of said inner vessel beneath said gas turbine assembly, said distribution/collection system comprising distribution means including inner conduit means for transporting exhaust gas from said turbine to each of a plurality of said first heat exchanger means and collection means including outer conduit means, coaxial to said inner conduit means, for transporting cooled gas from each of said first heat exchanger means to a collection point, said conduit means being comprised of horizontally



and vertically oriented sections, whereby said distribution means and said collection means are disposed coaxially with respect to one another; and

g. means for transporting cooled gas from said collection point to said reactor, including at least as many vertically extending cool gas conduit means as the number of said hot gas conduit means, one of said vertically extending cool gas conduit means coaxially surrounding the vertical section of each of said hot gas conduit means, whereby each of said conduits carrying gas at an elevated temperature is surrounded by cooler gas flowing in a coaxially arranged conduit.

3,998,058

METHOD OF EFFECTING FAST TURBINE VALVING FOR IMPROVEMENT OF POWER SYSTEM STABILITY

Robert H. Park, Brewster, Mass., assignor to Fast Load Control Inc., Brewster, Mass.

Filed Sept. 16, 1974, Ser. No. 506,441

Int. Cl.² F01K *13/02*

U.S. Cl. 60—652 **14 Claims**

1. In a power system which includes a plurality of prime mover driven generators, which are interconnected by a plurality of alternating current transmission circuits, and which include at least one generator that is driven by a compound type steam turbine incorporating control valves ahead of the high pressure turbine, and intercept valves ahead of the turbine or turbines that are driven by steam that is discharged by the high pressure turbine, the method of fast valving of the said compound turbine, as a way to avoid development of system instability, which comprises the steps of

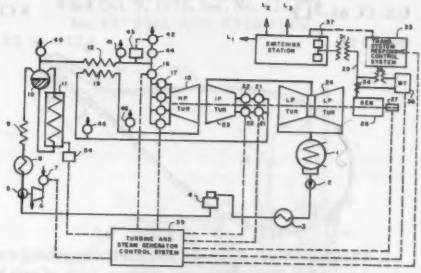
1. providing within the turbine's control system for a predetermined response to a fast valving signal input which response will bring into effect preprogrammed processes of,

a. at least partial closure of the turbine's intercept valves,

b. sustained type partial intercept valve reopening.

2. providing in a preprogrammed manner so that,

a. a fast valving signal is generated on the occurrence of system stability endangering events of a type that cause the said generator to experience a sudden at least momentary reduction of load,



b. the said fast valving signal is made available as an input to that portion of the turbine's control system that is adapted to bring into effect the said predetermined response.

3,998,059

POWER SYSTEMS

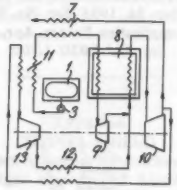
John Edward Randell, Wirral, England, assignor to National Research Development Corporation, London, England

Filed July 9, 1974, Ser. No. 486,915

Claims priority, application United Kingdom, July 12, 1973, 33503/73

Int. Cl.² F01K *25/10*

U.S. Cl. 60—659 **7 Claims**



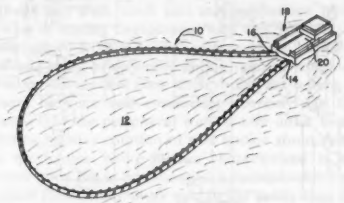
1. A power system comprising a heat-insulated storage container for receiving and storing, in liquid form, a working fluid which is gaseous at standard temperature and pressure and of non-toxic, non-inflammable nature, self-contained means for supplying heat, without the addition of energy thereto, during supply of liquid working fluid thereto, pump means for transferring liquid working fluid from said fluid storage means to heat exchange means for converting said liquid to its gaseous form, said heat exchange means being in a flow circuit including said pump means and said heat supply means, said means for supplying heat having a thermal capacity sufficient to raise the temperature of the pumped quantities of working fluid to at least 200° C above its critical temperature, an expansion device having at least one stage for converting heat-energy of the thus heated gaseous working fluid into mechanical work, compression means for compressing gas exhausting from said heat-energy conversion means, and duct means for conducting compressed gas from said compression means to said heat supply means for reheating said compressed gas for expansion in said heat-energy conversion means.

3,998,060

BARRIER FOR WATER CARRIED POLLUTANTS

Paul Preus, Smith Road, Toms River, N.J. 08753

Filed Apr. 14, 1976, Ser. No. 676,794
Int. Cl.² E02B *15/04*; B63B *35/00*
U.S. Cl. 61—1 F 6 Claims



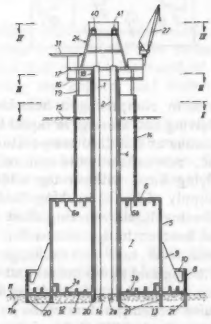
1. A barrier for water carried pollutants comprising a series of end to end connectable boom sections, each of said boom sections comprising a hollow tubular sleeve comprising the flotation means, a cable extending through each said sleeve and having an eye at each end externally of the ends of the sleeve, a separable connector passing through the eyes of adjacent boom sections, each said connector having a length greater than the cross dimensions of the boom sections, means at the ends of said connectors to releasably receive flexible draft means extending along each side of the barrier and fluid impervious cap means releasably secured to each end of a pair of adjacent boom sections.

3,998,061

FORMATION OF CAVITIES IN THE BED OF A SHEET OF WATER

Christian Jackie Rederon, Neuilly-sur-Seine; Gerard Pierre Souquet, Marly-le-Roi, and Paul Louis Poulallion, Villepreux, all of France, assignors to C. G. Doris (Compagnie Generale pour les Developement Operationnels des Richesses Sous-marines), Paris and Societe Francaise de Stockage Geologique GEOSTOCK, Courbevoie, both of, France

Filed Mar. 24, 1975, Ser. No. 561,660
Claims priority, application France, Apr. 4, 1974, 74.12044
Int. Cl.² E02D *21/00*
U.S. Cl. 61—88 10 Claims



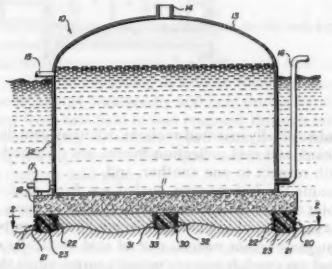
1. A method of forming galleries or other subterranean cavities in the bed of a sheet of water comprising the steps of
a. providing a floating structure at a location where galleries or cavities are to be formed comprising two hollow shafts having a height greater than the depth of the sheet of water at the location where said galleries or cavities are to be formed, said two shafts serving respectively for the execution of two bores one of which is used for access to the galleries or cavity excavations, and the other for the discharge of the spoil and as an emergency escape route;
b. ballasting said floating structure where said galleries or cavities are to be formed in order that the base of the hollow shaft rests upon the underwater surface;
c. excavating two bores in extension of said hollow shafts down to the desired depth;
d. casing said bores and hollow shafts in watertight fashion up to a point above the level of the sheet of water;
e. pumping the water out of the casings; and
f. excavating two access galleries or cavities starting respectively from said two bores and linking said galleries or cavities by a communication gallery, emergency airlocks being installed in the access galleries and in the communication gallery.

3,998,062

SEA FLOOR SUPPORTED STRUCTURES WITH CRUSHABLE SUPPORT

Kenneth Wilson Lange, Burr Ridge, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed June 23, 1975, Ser. No. 589,716
Int. Cl.² E02D *5/00*; E02B *17/02*
U.S. Cl. 61—50 5 Claims



1. In an offshore structure having a rigid base adapted to rest on a sea floor, the improvement comprising:
a crushable supporting means mounted beneath the rigid base and projecting downwardly therefrom; and
the crushable supporting means being adapted to be partially crushably compressed between the rigid base and the sea floor when the structure is submerged to rest on the sea floor, thereby adapting to and matching the contour of the sea floor and supporting the structure temporarily or permanently and creating a space, fillable with grout, between the rigid base and the sea floor bounded by the crushed supporting means in contact with the sea floor.

3,998,063

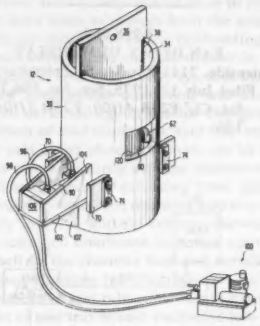
METHOD AND APPARATUS FOR REMOVING CONSTRUCTION PILES

Holton G. Harders, 5521 E. Highway 98, Panama City, Fla. 32401

Filed Feb. 17, 1976, Ser. No. 658,278
Int. Cl.² E02D *5/22*
U.S. Cl. 61—53 17 Claims

1. A clamp head for gripping solid wood or concrete construction piles comprising in combination; a casing having a hollow lower portion for receiving piles with the casing surrounding the pile, a pair of opposed gripping shoes in the casing for receiving a pile therebetween and gripping opposite sides thereof, the pile contacting surfaces of the gripping shoes being shaped to correspond to the contour of the pile to be gripped, means including a motor mounted to the casing for

moving at least one of said gripping shoes towards and away from the other gripping shoe for gripping and releasing a pile therebetween, mounting means in the casing receiving said one gripping shoe for maintaining and guiding said one gripping shoe for movement in a horizontal plane across the casing



towards and away from the other gripping shoe, coupling means on the casing for releasably securing to the casing a device for imparting movement to the pile through the clamp head when a pile is gripped by said shoes, and a stop member fixed in the casing above the shoes for limiting the uppermost position of a pile in the casing.

3,998,064

SUBAQUEOUS PILE DRIVING APPARATUS AND METHOD

Joost W. Jansz, The Hague, Netherlands, assignor to Hollandsche Beton Groep N.V., Rijswijk, Netherlands

Filed June 19, 1975, Ser. No. 588,054

Claims priority, application Netherlands, June 27, 1974, 7408710; Aug. 14, 1974, 7410905

Int. Cl.² E02D *7/00*

U.S. Cl. 61—53.5 **7 Claims**

1. In a system of subaqueous pile driving from a device above water level, in which the pile and pile hammer are brought completely under water, the improvement comprising: said pile suspended on at least one cable in such a manner that at least two cable sections run upwards from the top of said pile, parallel to each other, towards said device above the water-level, means carried by said device for lowering the pile on the cables to the ocean floor, said means also lowering the pile hammer and positioning it on the top of the pile, wherein said hammer is lowered simultaneously with said pile, and the pile hammer is guided on the cable sections.

3,998,065

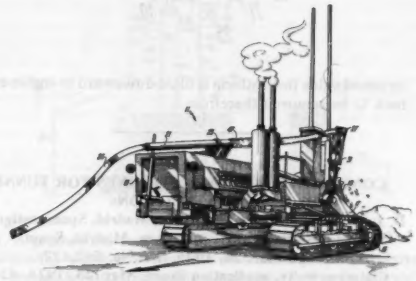
HORIZONTAL WELLPOINTING METHOD AND APPARATUS

James K. Darnell, Orlando, Fla., assignor to Charles F. Smith and Son, Inc., Kennett Square, Pa.

Filed Oct. 9, 1975, Ser. No. 621,078

Int. Cl.² F16L *1/00;* **E02B** *11/02*

U.S. Cl. 61—72.6 **10 Claims**



1. In a vehicle having a mechanically driven trencher at one end thereof, a system for laying a flexible perforated pipe in the trench created by said trencher comprising

a first rigid conduit mounted on said vehicle having its axis extending substantially in the direction of movement of said vehicle;

a second rigid conduit mounted adjacent said trencher with one end thereof terminating at the bottom of said trencher; both of said conduits being of a dimension to accept said flexible pipe, said first and second conduits being separated;

tubular filter fabric freely positioned about said first rigid conduit;

means for securing one end of said tubular filter fabric about the forward end of said pipe as it passes between said first and second rigid conduits; and

means for guiding said pipe and said fabric into and through said second conduit, whereby said pipe covered with said fabric is placed in said trench behind said trencher.

3,998,066

TUNNEL SHIELD

Alexandr Nikolaevich Semenov, 3 Dorozhny proezd, 4, korpus 2, kv. 141; Vazgen Khorenovich Klorikian, Erevanskaya ulitsa, 13, korpus 1, kv. 49; Nariman Alexandrovich Prostov, M. Dorogomilovskaya ulitsa, 23/25, kv. 24; Mikhail Dmitrievich Khalyavkin, ulitsa Chekhovskaya, 1 kv. 231; Ilya Emmanuilovich Reznikov, ulitsa Pavla Korchagina, 8, kv. 47; Izmail Makhmudovich Gergokov, ulitsa Moldagulovoi, 9, korpus 2, kv. 11; Jury Matveevich Gapanovich, ulitsa Artekovskaya, 5, korpus 1, kv. 67; Nikolai Pavlovich Evdokimenkov, Kuzminskaya ulitsa, 48, korpus 3, kv. 131, all of Moscow, and Josif Davydovich Fishman, ulitsa Mashinostroitelya, 13, kv. 20, Yasinovataya Donetskoi oblasti, all of U.S.S.R.

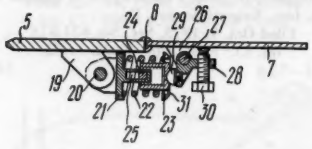
Filed Feb. 6, 1975, Ser. No. 547,880

Int. Cl.² E21D *9/04*

U.S. Cl. 61—85 **4 Claims**

1. In a shield for making tunnels in loose and low-stable rock, comprising a knife ring; vertical and horizontal partition knives disposed in said knife ring; horizontal proportional platforms connected with said horizontal partition knives so as to alter their position vertically in order to remove crushed rock therefrom, spring means supporting each of said horizontal proportioning platforms for keeping the platform in a given initial position when no load is applied to the platform, the force produced by said spring means being constantly directed

against the force of gravity of the rock and having a magnitude so that when rock is delivered in quantities exceeding a predetermined value the platform is tilted downward to enable excess rock to be removed therefrom.

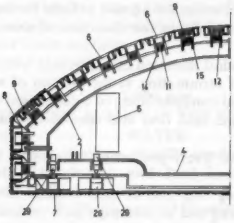


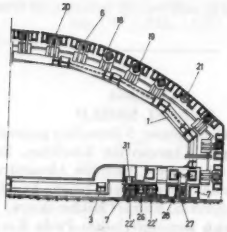
3,998,067

CONTINUOUS SHORING MACHINES FOR TUNNEL CONSTRUCTION

D. Julio Antonio Garcia Fernandez, Madrid, Spain, assignor to Mackina Westfalia, S.A. & Corsan, Madrid, Spain

Filed Mar. 26, 1975, Ser. No. 562,127
Claims priority, application Spain, Mar. 28, 1974, 424721
Int. Cl.² E01G *3/04*
U.S. Cl. 61—85 **5 Claims**





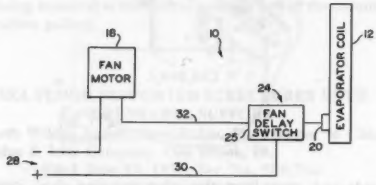
1. Improvements in continuous shoring machines for the construction of tunnels comprising in combination, a load-bearing structure for transverse supporting engagement with the tunnel walls, a plurality of supporting skids arranged in pairs in side-by-side relationship for supporting said load-bearing structure, shores mounted on said structure for shaping and shoring up the tunnel wall, elastic support means for connecting said structure with said shores, elastic support means for connecting said structure with said skids for guiding said skids for vertical and horizontal movement, each pair of skids having longitudinal wings extending laterally from the bottoms of their opposed faces and having portions arranged in overlapping relationship, said portions being provided with matching holes, a beam having a bottom surface located in the space between each pair of skids, a plurality of teeth on said beam bottom surface arranged to be accommodated within said holes, said teeth being long enough to serve as anchoring elements on the tunnel floor when projecting through said holes to facilitate the advance of the frame, said beam being pivoted at its front end on one pair of skids about a transverse axis, said beam having a back end and means including a hydraulic cylinder for connecting said beam to the load-bearing structure and said hydraulic cylinder being arranged to retract said teeth upon raising of said beam.

3,998,068

FAN DELAY HUMIDISTAT

William Chirnside, 7141 Bay St., St. Petersburg, Fla. 33706

Filed July 17, 1975, Ser. No. 596,755
Int. Cl.² F25B *41/00*; F25D *21/04*
U.S. Cl. 62—186 **6 Claims**



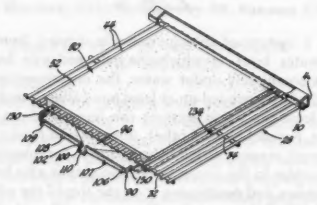
1. A humidistat assembly primarily designed for use in combination with an air conditioning assembly to delay operation of an evaporator fan, said air conditioning assembly incorporating an evaporator coil means, fan means disposed in fluid communication with said evaporator coil means, motor means drivingly connected to said fan means, whereby air is circulated through said evaporator coil means and forced to exit from said air conditioning assembly upon activation of said motor means and operation of said fan means; said humidistat assembly further comprising sensing means mounted in direct engagement with said evaporator coil means, electrical current flow regulating means electrically connected to said sensing means and disposed in current conductive and regulating relation between said fan means and a supply of electric current connected to said motor means, said regulating means comprising switch means movable between an open and closed position and operatively interconnected to said sensing means, said sensing means being preset to close said switch means at a predetermined low temperature near 32° F and to open said switch means at a predetermined higher temperature above 32° F thereby providing fan delay operation allowing condensate run off prior to forced air flow over the evaporator.

3,998,069

REFRIGERATOR RECEPTACLE SUPPORT AND ADJUSTABLE AIR DEFLECTOR-DRIP TRAY

Paul E. Kronenberger, Dayton, and Ralph S. Braden, Bellbrook, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 18, 1975, Ser. No. 614,436
Int. Cl.² F25D *21/14*
U.S. Cl. 62—288 **4 Claims**



1. In combination with a refrigerator cabinet having a food

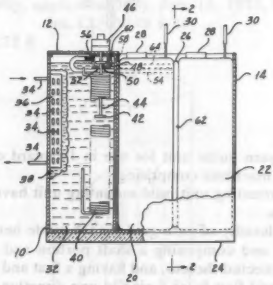
storage chamber, a shelf removably mounted in cantilever fashion from the rear wall of the chamber having a plurality of longitudinal extending spaced open areas, a food storage assembly including a drawer and a supporting cover plate member therefor overlying the upper surface of the shelf, said cover plate including integral flange means depending from each side thereof and laterally spaced so as to extend through a pair of the open areas to project from the underside of the shelf, said flange means providing confronting longitudinal extending trackways, means on said drawer in slidable supporting engagement with said trackways, said drawer having a predetermined longitudinal dimension less than said plate member, an air deflector tray in slidable engagement with the rearward portion of said trackways, said tray being vertically spaced from said cover plate to provide an air flow passage therebetween communicating with the interior of the drawer, a plurality of spacer means extending from the rear wall of said tray, releasable means for retaining said tray in said trackways, whereby said tray initially extends rearwardly from the shelf a predetermined dimension such that upon the installation of the shelf on the chamber rear wall certain ones of said tray spacer means engage the chamber rear wall resulting in the disengagement of said releasable means causing telescoping movement of said tray in said trackways to a final position compensating for any undulations in the chamber rear wall, and thereby positioning said tray to direct the required quantity of refrigerated air dispensed to the chamber into the drawer via said air flow passage while said spacer means define a passage to allow condensate on the chamber rear wall to flow downwardly past said tray.

3,998,070

SYRUP COOLING SYSTEM FOR COLD DRINK MACHINE

Richard J. Mueller, Mountain Lakes, N.J., assignor to Rowe International Inc., Whippany, N.J.

Filed May 28, 1975, Ser. No. 581,559
Int. Cl.² B67D *5/62*
U.S. Cl. 62—393 **8 Claims**



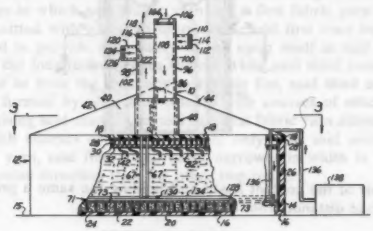
1. In a cold drink dispensing machine, apparatus comprising:
a cold water bath tank;
means for chilling the water in said water bath tank;
a pair of generally rectangular syrup tanks;
a generally planar vertically oriented heat exchanger;
means for circulating water from said water bath tank through said heat exchanger and back to said water tank; and
means for positioning said syrup tanks on either side of said heat exchanger in intimate contact therewith.

3,998,071

GREENHOUSE AIR-COOLING APPARATUS

Gerhard Barthel, 14657 Juliana St., East Detroit, Mich. 48021

Filed Dec. 31, 1975, Ser. No. 645,802
Int. Cl.² F25D *11/00*
U.S. Cl. 62—430 **10 Claims**



1. A greenhouse cooling apparatus, comprising
a cooling water tank disposed substantially entirely above ground level and including a base structure and a sidewall structure and a top wall structure,
a first water-cooling heat exchanger immersed in said tank below the intended water level thereof and having an air-conducting passageway therethrough with an air inlet and an air outlet therein,
a greenhouse-cooling heat exchanger also immersed in said tank below the intended water level thereof and also having an air-conducting passageway therethrough with an air inlet and an air outlet therein,
an air intake stack and an air outlet stack disposed in upstanding relationship to said tank and connected at their inner ends to said greenhouse-cooling heat exchanger inlet and outlet respectively,
power-driven air-moving means communicating with said air intake stack and with said first water-cooling heat exchanger for forcing cold winter air from the exterior of the greenhouse through said air intake stack and through said first water-cooling heat exchanger for freezing the water in said tank,
and air flow control means for selectively directing warm air from the interior of the greenhouse by way of said air intake stack through said greenhouse-cooling heat exchanger and back through said outlet stack to the exterior of the greenhouse and alternatively for directing cold winter air from the exterior of the greenhouse by way of said air intake stack through said first water-cooling heat exchanger and back through said outlet stack to the exterior of the greenhouse.

3,998,072

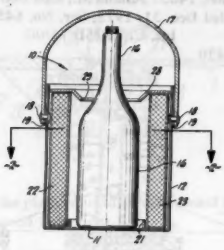
PORTABLE WINE COOLER

Howard G. Shaw, Ross, Calif., assignor to Shaw-Clayton Plastics, Inc., San Rafael, Calif.

Filed Mar. 12, 1975, Ser. No. 557,825
Int. Cl.² F25D *3/08*
U.S. Cl. 62—457 **8 Claims**

1. A portable cooler for keeping a bottle of wine or the like chilled, comprising: a carrying case having a bottom wall and a generally cylindrical side wall, a lower retaining ring comprising an upwardly extending annular flange of greater diameter than the bottle disposed coaxially of the bottom wall and adjacent thereto, a plurality of axially extending flasks of coolant removably disposed in the case and spaced peripherally thereof to form a centrally disposed chamber for receiving the bottle in an upright position, the lower portions of the

flasks resting between the flange and the side wall of the case, and a removable retaining ring for engaging the upper portions of the coolant flasks and holding the same a predetermined distance from the center of the case.

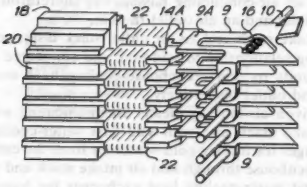


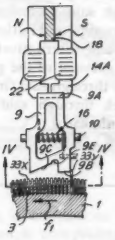
3,998,073

SELECTION DEVICE FOR OSCILLATING JACKS IN A CIRCULAR KNITTING MACHINE

Claus-Peter Lüth, Florence, Italy, assignor to Macchine Tessili Circolari-Matec S.p.A., Rome, Italy

Filed Aug. 15, 1975, Ser. No. 605,205
Claims priority, application Italy, Aug. 20, 1974, 9551/74
Int. Cl.² D04B 9/00
U.S. Cl. 66—50 R **4 Claims**





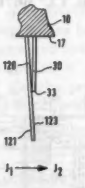
1. In a circular knitting machine
a needle cylinder containing grooves,
an oscillating jack in each said groove, said jack having a butt, and
a jack selection device comprising
a selector lever pivotal between an active position and an inactive position, said lever having a radial thrust profile co-operating with said butts in the active position of the lever to urge the butts radially, said lever having a control profile co-operating with said butts such that the butts cause the lever to pivot in a first direction towards one of the said positions, said control profile being located before the thrust profile whereby the butts act on the control profile before the thrust profile, said control profile being spaced from the thrust profile by such a distance that the lever can be pivoted while one said butt is located between the profiles,
bias means including spring means for applying a pivotal bias to said lever in a direction opposite to said first direction,
permanent magnet means for magnetically retaining the lever in said one position, and
electromagnetic winding means for temporarily neutralizing the flux of said magnet means whereby said lever can be moved from the said one position towards the other position by said bias means, said winding means being program-controlled, the engagement of the control profile by a butt causing the lever to move into its active position such that the thrust profile can then engage the said butt, the permanent magnet means being arranged to hold the lever in its active position while the bias means is arranged to pivot the lever into its inactive position upon neutralization of the flux of the permanent magnet means.

3,998,074

YARN GUIDE UNITS FOR JACQUARD CONTROLLED WARP KNITTING MACHINES

Karl Kohl, Chlorodont Str. 10, Obertshausen, Germany (6053)

Filed Mar. 15, 1976, Ser. No. 666,564
Claims priority, application Germany, Mar. 17, 1975, 2511550
Int. Cl.² D04B 23/00, 27/00
U.S. Cl. 66—214 **9 Claims**



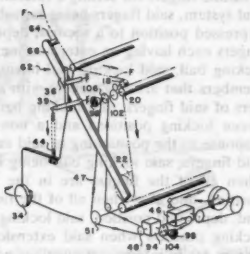
1. A yarn guide unit for use in Jacquard controlled warp knitting machines comprising:
a. a mounting unit, said mounting unit having a transverse axis,
b. a plurality of yarn guides each guide being substantially flat and comprising a shaft portion and a head portion connected thereto, and having a first and second face, all of said first faces facing in one direction, and all of said second faces facing in the opposite direction, said shaft portion having a longitudinal axis,
c. a plurality of rigid tabs, said tabs being shorter than said guides and comprising a head portion and a shaft portion connected thereto, said shaft portion having a longitudinal axis,
said shaft portion of said yarn guides and said shaft portion of said tabs being mounted side-by-side in said mounting unit, said tabs alternating in said mounting unit with said guides,
wherein the free end of the head portion of the tabs contacts said first face of the yarn guide adjacent thereto.

3,998,075

CIRCULAR KNITTING MACHINE QUICK DRIVE DISCONNECT

Robert Saul Brown, Spartanburg; Paul W. Eschenbach, Inman, and Herbert Ray King, Spartanburg, all of S.C., assignors to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Apr. 28, 1975, Ser. No. 572,432
Int. Cl.² D04B 15/88
U.S. Cl. 66—149 R 6 Claims



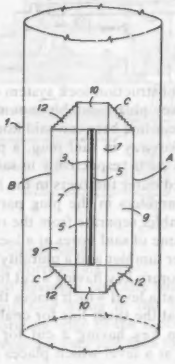
1. A circular knitting machine comprising: first means to produce a knitted fabric, a second means to take up the knitted fabric mounted on said machine, a pair of rolls in nip forming relationship located between said first means to produce and said second means to take up knitted fabric receiving fabric from said first means to produce and delivering knitted fabric to said second means to take up fabric, a third means to drive said pair of rolls and said second means to take up fabric in synchronism, a fourth means driving said third means and a fifth means resiliently held into readily releasable engagement with said fourth means to cause said fourth means to drive said third means.

3,998,076

ELASTICATED WAIST OPENING

Massimo Bianchi, and Paolo Conti, both of Florence, Italy, assignors to Billi, S.p.A., Florence, Italy

Filed Feb. 14, 1974, Ser. No. 442,751
Claims priority, application Italy, Feb. 16, 1973, 9338/73
Int. Cl.² D04B 9/46
U.S. Cl. 66—172 E 8 Claims



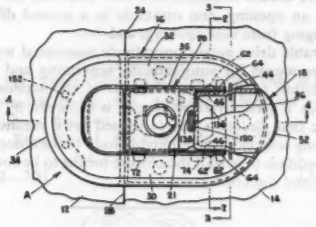
1. A tubular knit article having opposite ends and a longitudinal cut extending wale-wise and terminating between said ends, and a plurality of elongated zones bounding the longitudinal marginal edges of said cut and extending only partially around the circumference of the tubular article, each said zone extending course-wise and transversely of said longitudinal cut, said zones including a first zone immediately proximate said cut and including interknitted elastic and fabric yarn forming an elastic band, a second zone bordering said first zone and including interknitted elastic and fabric yarn and a third zone bordering said second zone and including interknitted elastic and fabric yarn, said first zone including successive courses in which said elastic yarn and a first fabric yarn are interknitted with a second fabric yarn, said first zone being knitted to provide a tendency to roll upon itself at said cut along the longitudinal edges thereof while said third zone is knitted to have the tendency to remain flat, said third zone being formed by plain knit stitches with courses of stitches comprising said elastic yarn and said first fabric yarn alternating with courses of stitches formed only with said second fabric yarn, said first zoned being narrower in width in the coursewise direction than the other two zones.

3,998,077

DRAW BOLT

Lazlo Bako, Woodcliff Lake, N.J., assignor to Presto Lock Company, Division of Walter Kidde & Company, Inc., Elmwood Park, N.J.

Filed Oct. 10, 1975, Ser. No. 621,346
Int. Cl.² A45C 13/10
U.S. Cl. 70—74 9 Claims



1. A drawbolt comprising:

a latch having a pair of spaced side walls;

each side wall having an edge, a longitudinally directed slot, one end of which is closed and the other end of which opens at said edge, and an outwardly extending lug, the slots in the sidewalls being aligned and the lugs being aligned;

a loop member having a cross-bar received in the slots in the latch, the length of the bar exceeding the spacing between the side walls of the latch;

frame means having a pair of guide walls spaced from each other less than the length of said cross-bar;

each guide wall having a longitudinal mounting edge, an aperture that opens at the last mentioned edge, and a curved peripheral cam edge, the apertures in the guide walls being aligned and the cam edges being aligned;

the latch being located with its side walls adjacent the respective guide walls of the frame means with the lugs received in the respective apertures of the frame means for effecting pivotal movement of the latch on the frame means; and

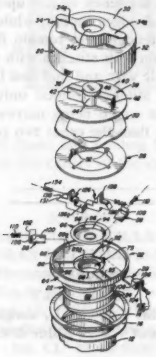
the bar of loop member being trapped between the cam edges of the guide walls of the frame means and the closed ends of the slots in the side walls of the latch for causing the bar to be constrained to move in a curved path in response to pivotal movement of the latch.

3,998,078

LIMITED TORQUE LOCKING FUEL CAP

Timothy Detwiler, Franklin Grove, Ill., assignor to E. Edelmann & Co., Skokie, Ill.

Filed June 30, 1975, Ser. No. 591,932
Int. Cl.² B65D 55/14
U.S. Cl. 70—171 22 Claims



1. A locking limited torque cap, comprising, in combination:

closure means rotatable in a first direction for selectively closing an opening, and rotatable in a second direction for disengaging from said opening; and

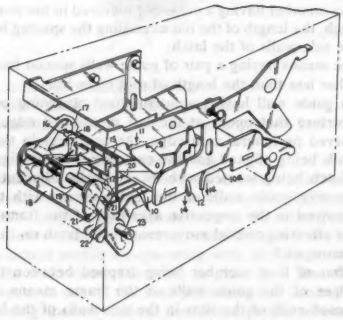
separable drive means operatively associated with the closure means for automatically separating and preventing rotation of the closure means in the second direction once a predetermined torque is achieved by rotation in the first direction, the separated drive means thereafter being selectively manipulable back to their non-separated condition to permit the closure means to be rotated in the second direction.

3,998,079

LOCKING SYSTEM

Frederick W. Uthenwoldt, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 22, 1975, Ser. No. 606,964
Int. Cl.² E05B 37/16
U.S. Cl. 70—292 6 Claims



1. A combination locking system of the type having a tape containing a plurality of predetermined reference combination serially disposed thereon, said tape being advanced to a new reference combination position for each unlocking operation performed upon said system, a new combination position for each unlocking operation performed upon said system, a new combination being entered into said locking system for each unlocking operation, which newly entered combination being required to complement a new predetermined reference combination which has been advanced upon said tape in order to unlock a lock of said locking system, the combination locking system comprising:

depressible fingers for setting a reference combination into said system, said fingers being movable from a first, non-depressed position to a second, depressed position, said fingers each having an extension member; and

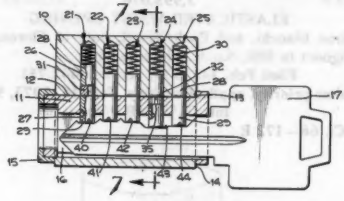
a locking bail, said locking bail having spring loaded jaw members that are engageable with said extension members of said fingers, said locking bail being movable between locking positions and a non-locking position in response to the positioning of said extension members of said fingers, said locking bail being in a locking position when all of the fingers are in the first, non-depressed position, and also when all of the fingers are in the second, depressed position, said locking bail being in a non-locking position when said extension members of said fingers are in intermixed positions corresponding to having at least one but not all of the fingers in the second, depressed position.

3,998,080

FRANGIBLE CONSTRUCTION LOCK SYSTEM

William J. Fane, North Vancouver, Canada, assignor to Norris Industries, Inc., South Gate, Calif.

Filed Apr. 30, 1975, Ser. No. 573,067
Int. Cl.² E05B 35/08, 27/00, 25/00
U.S. Cl. 70—338 13 Claims



1. A frangible construction lock system comprising a housing, a cylindrical key plug rotatably mounted in said housing productive of a shear line between said housing and said plug, means forming a keyway in said plug, a plurality of tumbler bores with aligned parts respectively in said housing and said plug, spring pressed outer tumblers in the housing parts of the bores and inner tumblers in the plug parts of the bores, an extra frangible tumbler separate from the respective outer and inner tumblers in one of said bores at a location inwardly with respect to the outer tumbler and a plurality of keys, one of said keys being a temporary key having a cut for the bore with the frangible tumbler at a level which places the outer end of said frangible tumbler at the shear line for enabling rotation of the plug, a conversion key having a cut for the bore with the frangible tumbler at a level which places said frangible tumbler across the shear line whereby upon rotation of said plug the frangible tumbler is destroyed, and another key having a cut for the bore with the frangible tumbler at a level which places the outer end of the inner tumbler at the shear line for enabling rotation of the plug by said other key.

3,998,081

ELECTROMAGNETIC DENT PULLER

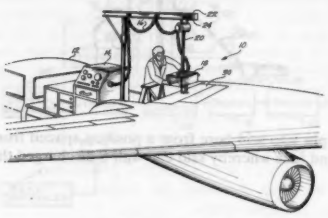
Karl A. Hansen, and Iver Glen Hendrickson, both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed July 17, 1974, Ser. No. 489,290

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] B21D *26/14*

U.S. Cl. 72—56 32 Claims



20. A method of electromagnetically pulling dents from conductive material, the steps comprising: positioning a working surface of a working head of a nonconducting material adjacent a dent in a part; energizing a coil within the head, shaped for electromagnetic coupling to the part, with a slowly rising current; controlling the amplitude and duration of the current for generating a strong electromagnetic field without deforming the part; introducing a countercurrent into the coil; controlling the amplitude of the countercurrent to about 50 to 100 percent of the slowly rising current; and timing the duration of the countercurrent to generate a deforming tensioning magnetic force against the part to remove the dent.

3,998,082

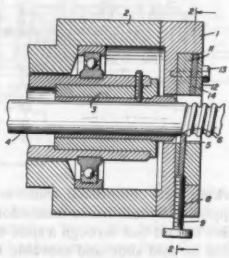
DEVICE FOR THE MANUFACTURE OF HELICALLY CORRUGATED TUBES

Kurt Müeller, Hannover, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Feb. 20, 1975, Ser. No. 551,308

Int. Cl.[2] B21D *15/06*

U.S. Cl. 72—77 4 Claims



1. A corrugator, comprising:

a driven rotatable corrugating head;

a corrugating tool having a helically shaped forming edge, said corrugating tool being in the form of a segment whereby the forming edge of the tool is in contact with a tube to be corrugated over less than the circumference of the tube;

mounting means for directly mounting the corrugating tool to the corrugating head, said means including means for pivotally supporting the tool and clamping means for clamping the corrugating tool to the corrugating head;

means to change and maintain the position of the pivotally mounted corrugating tool with respect to the tube to adjust the depth of the corrugation, said means for changing and maintaining the position of the pivotally mounted corrugating tool maintaining the forming edge of the corrugating tool in contact with a tube during rotation of the corrugating head to produce a helical corrugation.

3,998,083

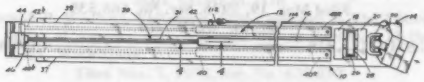
STRAIGHTENING APPARATUS

E. Donald Dilling, Albany, Oreg., assignor to Kawecki Berylco Industries, Inc., Reading, Pa.

Filed Aug. 11, 1975, Ser. No. 603,689

Int. Cl.[2] B21D *3/00*

U.S. Cl. 72—81 10 Claims



1. Straightening apparatus comprising

advancing means for advancing an elongate work element while rotating the same about its longitudinal axis,

means forming a bending station in said apparatus, operable as the work element progresses through the station, to bend the work element across the longitudinal axis thereof, and

means operatively interconnecting the means for advancing the work element and the means forming the bending station operable to vary the degree of bend imparted to the work element by the means forming the bending station as the work element is advanced by the advancing means.

3,998,084

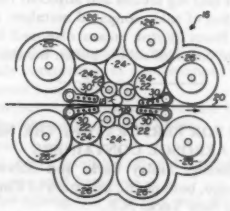
COOLING SPRAY SYSTEM FOR ROLLING MILL

Francis Rerecich, Dover, N.J., assignor to Marotta Scientific Controls, Inc., Boonton, N.J.

Filed Nov. 1, 1974, Ser. No. 520,353

Int. Cl.[2] B21B *45/02*

U.S. Cl. 72—201 13 Claims



1. Apparatus for rolling sheet metal including in combination rolls comprising a roll pass for passage of sheet metal through a bite of the rolls as the sheet metal travels therethrough to reduce the thickness of the sheet, and means for cooling the sheet metal comprising a plurality of groups of spray nozzles having discharge outlets, the nozzles being at spaced locations in directions parallel to the axes of the rolls and across the width of the sheet, a supply passage that communicates with said nozzles at different locations widthwise of the sheet, adjustment means at each nozzle for controlling the rate of coolant flow, and different control apparatus connected with said adjustment means of the different nozzles for regulating the flow of coolant selectively to the different nozzles, characterized by each of the nozzles having a movable element extending into the discharge outlet and movable with respect to the outlet to change the cross-section of the coolant

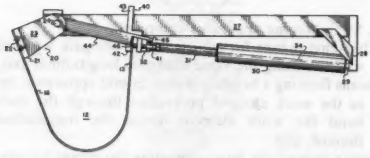
discharge outlet area of the nozzle to prevent a reduction in the rate of coolant flow from causing a corresponding reduction in the velocity of the discharge of the coolant spray from the nozzle, the adjustment means comprising a chamber upstream from the discharge outlet, a movable wall with one side facing said chamber and responsive to changes in the rate of flow of coolant to the nozzle and operatively connected with said movable element, so that said element moves in response to movement of said wall, and means for exerting a counter pressure against the other side of the wall.

3,998,085

ELEVATOR BUCKET SHAPE RESTORATION TOOL

Charles L. Horn, and Clifford B. Persinger, both of Covington, Va., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,539
Int. Cl.² B21D *1/10*
U.S. Cl. 72—316 **4 Claims**



1. A bucket shape restoration tool comprising:

A. An elongated, rigid load carrying member having a linear motor socket base secured thereto;

B. Base platen means secured to a first bucket wall and having a pivotal connection to one end of said elongated member;

C. Confining yoke means for confining said elongated member to a position transversely adjacent an edge of a second bucket wall opposite from said first wall, said yoke means having two leg means and interconnecting bight means, said leg means having second wall clamping means, said elongated member being confined between said bight means and said second wall edge;

D. Motor platen means for engaging said second wall in an area between said leg means and adjacent the edge transversing position of said elongated member; and,

E. Expansible linear motor means disposed between said motor socket base and said motor platen means.

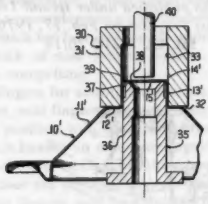
3,998,086

APPARATUS FOR PERFORATING THE NECKS OF AEROSOL CONTAINERS

James Robert Hoenig, Tinley Park, and Salvador Carigan Mallorca, Chicago, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Division of Ser. No. 524,146, Nov. 15, 1974, Pat. No. 3,910,213. This application May 30, 1975, Ser. No. 582,438
Int. Cl.² B21D *28/04, 28/02*
U.S. Cl. 72—325 **4 Claims**

1. Apparatus for perforating the necks of aerosol containers comprising a punch having a generally cylindrical exterior surface, an axial bore and a terminal end face, a juncture between said exterior surface and terminal end face defining an axially terminal circumferential cutting edge, an annular guide ring having an interior generally cylindrical surface, means for providing relative axial movement between said punch and guide ring, said punch including a terminal cylindrical surface adjacent said end face of a reduced diameter as compared to the remaining diameter of said punch cylindrical exterior surface thereby providing a relief area to facilitate the drawing of an aerosol end neck wall in sandwiched relationship between said punch cylindrical exterior surface and said annular guide cylindrical interior surface during relative movement therebetween whereby an end wall of the aerosol end is ripped under tension by said cutting edge, a knockout pin in alignment with said bore, and means for moving said



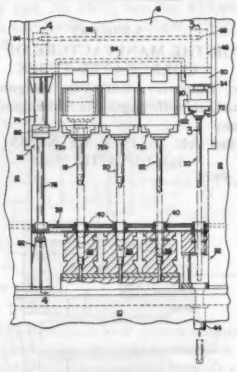
knockout pin into said bore from a position spaced from said terminal end face whereby said end wall is discharged through said bore.

3,998,087

PRESS SLIDE WITH EXTENDABLE AND RETRACTABLE TOOL SUPPORT

John P. Schumacher, and William F. Hollenbeck, both of Louisville, Ohio, assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Oct. 30, 1975, Ser. No. 627,224
Int. Cl.² B21D *24/00*
U.S. Cl. 72—349 **13 Claims**

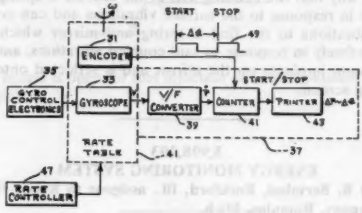


1. A metalworking press comprising, frame means including a bed, a slide supported by said frame means for reciprocating movement relative to said bed through a slide stroke, hydraulic cylinder means on said slide and movable therewith, tool support means including reciprocable ram means, said ram means including piston means in said cylinder means and reciprocable relative thereto to displace said ram means relative to said slide and through a second stroke, means to reciprocate said slide, and hydraulic pump means connected to said cylinder means and driven by said slide to displace said ram means through said second stroke during movement of said slide through said slide stroke, said pump means including relatively reciprocable piston and cylinder members mounted one on said slide and the other on said frame means, and the cross-sectional area of said cylinder means being greater than the cross-sectional area of said cylinder member.

3,998,088
TESTING APPARATUS FOR INCREMENTAL SHAFT ENCODER

Thomas Kazangey, Cerritos, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,281
Int. Cl.² G01C *25/00*
U.S. Cl. 73—1 E **4 Claims**



1. Testing apparatus for an incremental shaft encoder comprising:

a. a rotatable rate table supporting the incremental shaft encoder;

b. a rate-integrating gyroscope mounted upon the rate table;

c. a voltage-to-frequency converter fed by the gyroscope, the output being a series of pulses;

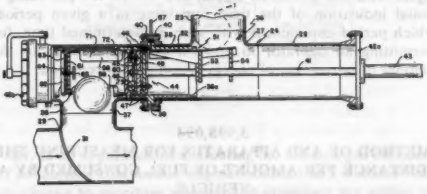
d. means for counting the output pulses of the voltage-to-frequency converter, the counting means being activated and deactivated by the incremental shaft encoder output; and

e. a printer fed by the counting means.

3,998,089
LIQUID METER PROVER APPARATUS

Marvin H. Grove, Houston, and Ronald G. Dunegan, Katy, both of Tex., assignors to M & J Valve Company, Houston, Tex.

Filed Nov. 10, 1975, Ser. No. 630,549
Claims priority, application United Kingdom, July 11, 1975, 29266/75
Int. Cl.² G01F *25/00*
U.S. Cl. 73—3 **5 Claims**

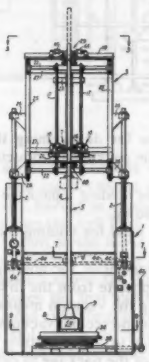


1. In meter proving apparatus of the type having a meter proving pipe loop adapted to receive a flow propelled sphere, a hollow interchange body, the body having a first opening through which a sphere may pass from the outlet of a metering pipe loop into the interior of the body and a second opening spaced axially from the first opening through which a sphere may pass from the body to the inlet end of the meter prover loop, a shuttle assembly disposed within the body, the assembly including a plunger and a sphere carrier secured to the plunger, the carrier having a sphere accommodating cavity of limited length, the assembly being movable in opposite directions between a first sphere launching position and a second sphere receiving position, the spacing between the centers of the openings in the body corresponding generally to the distance of movement of the shuttle assembly between its operating positions, a cylindrical sleeve carried by the body and located between said openings, the sleeve having an internal diameter greater than the diameter of the sphere, resilient sealing means carried by the plunger and forming a seal between the plunger and the sleeve, a backflow preventing means carried by the sphere carrier, said means serving to establish a seal for the interchange when within the sleeve, the length of the sleeve and the axial spacing between the sealing means carried by the plunger and the sealing means of the backflow preventing means being such that an interchange seal is maintained for said first and second positions of the shuttle assembly, and means extending from one end of the sleeve for engaging the periphery of and for guiding the backflow preventing means for movements of the shuttle assembly between said first and second positions.

3,998,090
SOIL COMPACTOR

Joseph P. Wislocki, Vicksburg, Miss., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 7, 1975, Ser. No. 629,812
Int. Cl.² G01N *1/28, 33/24*
U.S. Cl. 73—12 **4 Claims**



4. Apparatus for compacting specimens of soil and earth rock materials comprising, in combination:

a. a U-shaped base member;

b. a superstructure, mounted above said base and movable vertically with respect to said base;

c. a hammer;

d. gripping means mounted on said superstructure for holding releasing said hammer;

e. means for raising and lowering said gripping means with respect to said superstructure;

f. a rotatable platen mounted directly below said hammer to hold a specimen to be compacted;

g. means to rotate said platen in response to the completion of each compaction stroke of said hammer;

h. means to count the number of compaction strokes imparted to a given specimen;

i. means to stop compaction in response to said counting means reaching a certain preselected number;

j. trip means to limit the upper and lowermost travel of said gripping means;

k. means for causing said gripping means to disengage said hammer in response to said gripping means reaching said upper travel limit, thus allowing said hammer to drop upon a specimen to be compacted;

l. means for causing said gripping means to engage said hammer in response to said gripping means reaching said lowermost travel limit;

m. auxiliary grippers fixedly mounted to said superstructure and concentric with said gripping means.

3,998,091

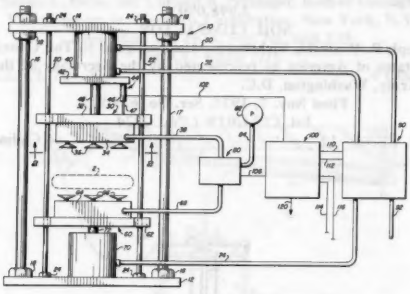
TEST APPARATUS FOR DETERMINING QUALITY OF PACKAGING FOR VACUUM PACKAGED PRODUCTS

Michael W. Paquette, 4044 W. Palo Verde, Phoenix, Ariz. 85019; John I. Hess, 4201 Norwalk Drive, No. 310, San Jose, Calif. 95129, and William J. Haber, 1525 E. Northshore Drive, Tempe, Ariz. 85283

Filed June 23, 1975, Ser. No. 589,357

Int. Cl.² G01M *3/00*

U.S. Cl. 73—52 **30 Claims**



1. Test apparatus for determining the quality of flexible packaging of vacuum packaged products, comprising, in combination:

vacuum means for holding a package to be tested on opposite sides, including

a first vacuum head for holding the package on one side thereof,

a second vacuum head for holding the package on another side opposite from the first vacuum head;

means for moving the vacuum means, including means for moving the first and second vacuum heads relatively away from each other to apply a stress to the package from opposite sides of the package to deflect the package; and

means for comparing the deflection of the package to a predetermined standard to determine the quality of the package.

3,998,092

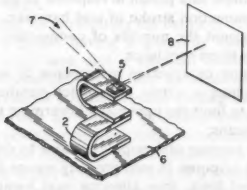
SIMPLE SYSTEMS FOR LIGHT BEAM MODULATION BY ACOUSTIC SURFACE WAVES

Bruce Sargent Maccabee, 10706 Meadowhill Road, Silver Spring, Md. 20901

Filed Dec. 23, 1974, Ser. No. 535,965

Int. Cl.² G01H *1/00*

U.S. Cl. 73—71.3 **2 Claims**



1. A system for the detection of surface vibrations that comprises two U shaped springs, each spring having flat surfaces on either side of the bent portion of the spring, said bent portion having a bending axis and said flat surfaces being parallel to each other and also to the bending axis, a light beam, a mirror, and a viewing screen, which are combined in such a way that the mirror is fastened to the flat surface of one side of the first of the U-springs, the flat surface of the other side of that U-spring is fastened to the flat surface of one side of the second U-spring in such a way that the bending axes of the two joined U-springs are at an angle greater than zero degrees, the other flat side of the second U-spring is fastened to the surface on which the vibrations are to be detected in such a way that the bending axis of the second U-spring can vibrate in response to the surface vibrations and can couple said vibrations to the first U-spring and mirror which can vibrate freely in response to said coupled vibrations, and the light beam impinges on the mirror and is reflected onto the viewing screen.

3,998,093

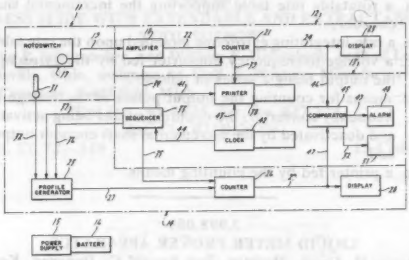
ENERGY MONITORING SYSTEM

Robert B. Bertolasi, Rockford, Ill., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Apr. 7, 1975, Ser. No. 565,632

Int. Cl.² G01L *3/26*

U.S. Cl. 73—112 **16 Claims**



12. A device for monitoring the consumption of energy of a system comprising means for generating a signal indicative of the desired energy consumption of the system, starting at a predetermined time, means for measuring the energy actually consumed by the system starting at such predetermined time, means for providing a visual comparison of the generated signal with the measured signal, and means for providing a visual indication of the time remaining in a given period, which period commences with such predetermined time, for permitting an operator to make a determination as to the amount of correction of energy consumption required.

3,998,094

METHOD OF AND APPARATUS FOR MEASURING THE DISTANCE PER AMOUNT OF FUEL CONSUMED BY A VEHICLE

Barrie James Martin, Shenfield, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed July 31, 1975, Ser. No. 600,923

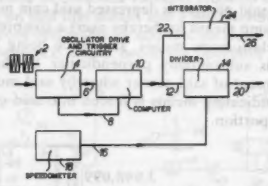
Claims priority, application United Kingdom, Aug. 10, 1974, 35317/74

Int. Cl.² G01L *3/26*

U.S. Cl. 73—114 **8 Claims**

1. A method of measuring the distance per amount of fuel that is being consumed by an engine of a vehicle at any one instant, which method comprises measuring the fuel flow rate to the engine of the vehicle, measuring the vehicle speed, and dividing the vehicle speed by the vehicle fuel flow rate, the method being such that the fuel for the engine is injected through a fuel injection nozzle which is opened for fuel injection by providing the injection nozzle with electrical pulses during periods in which the fuel is to be fed to the engine, and

the method also being such that the fuel flow rate is measured by measuring and multiplying together the time that the injection nozzle is open for fuel injection and the repetition time of the pulses.



3,998,095

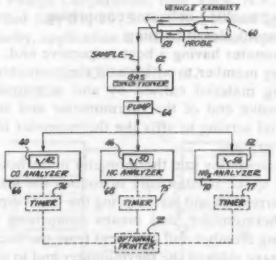
METHOD AND APPARATUS FOR QUICKLY EVALUATING ENGINE EXHAUST GAS EMISSIONS

Leland P. Tinkham, Desert Hot Springs, and Edwin Lee Cline, Pasadena, both of Calif., assignors to Clayton Manufacturing Company, El Monte, Calif.

Continuation-in-part of Ser. Nos. 306,815, Nov. 15, 1972, abandoned, and Ser. No. 431,299, Jan. 7, 1974, Pat. No. 3,938,377. This application July 28, 1975, Ser. No. 599,934

Int. Cl.² G01M *15/00*

U.S. Cl. 73—117 128 Claims



89. In an apparatus for evaluating the exhaust gas emissions of an internal combustion engine mounted in a wheeled vehicle chassis to ascertain whether the emissions are within acceptable air pollution values for CO and HC at different prescribed test modes of engine loading, the combination which comprises:

a chassis dynamometer having at least one roll to be engaged by the driven wheels of the vehicle, the dynamometer including a power absorption unit connected to the roll to provide a selectable load to the engine;

an exhaust gas analyzer adapted to be coupled to the engine exhaust for providing CO and HC signals, each of said CO and HC signals being representative of the quantitive measurement of the CO and HC content in the exhaust emissions;

gas signal stabilizing means responsive to the CO and HC signals for producing stabilized CO and HC signals when said signals have remained within a preset range for a given time interval.

3,998,096

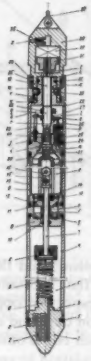
SUBSURFACE DIFFERENTIAL PRESSURE RECORDER

Valentin Eugen Hanciulescu; Dumitru Milos; Costel Serban; Ion Lazar, and Stefan Fanica, all of Cimpina, Romania, assignors to Institutul de Cercetari si Proiectari Pentru Petrol si Gaze, Cimpina, Romania

Filed Aug. 8, 1975, Ser. No. 603,144

Int. Cl.² E21B *47/06*

U.S. Cl. 73—151 9 Claims



1. In a device for measuring pressure variations in a well bore which are small with respect to the absolute pressure in the well bore, the device having an elongated tubular casing adapted to be lowered into the well bore, the casing having a first, lower chamber, a port in the lower chamber providing communication between it and the well bore, a second, recording chamber disposed above the first chamber in the casing, a partition between the first and second chambers, a piston in the form of a rod extending lengthwise of the casing through the partition and having its opposite ends disposed respectively in the first and second chambers, means sealing the piston to the partition while permitting the piston to reciprocate with respect thereto, the piston moving axially under the influence of pressure differentials arising between the first and second chambers, yieldable means disposed in the first chamber and acting between the lower end of the piston and the lower end of the casing, a stylus mounted on the upper end of the piston within the second chamber to reciprocate with the piston, means holding a chart within the second chamber for cooperation with the stylus, a clock for rotating the stylus and chart relative to each other, and means to introduce gas, at the surface, into the second chamber, the improvement which comprises valve means for selectively connecting the second chamber to the well bore to equalize the pressure therebetween and for disconnecting the second chamber from the well bore, and means controlled by the clock for opening the valve and thereafter closing the valve after said equalization of pressure.

3,998,097

FLOW-MEASURING DEVICE

Koichiro Akashi; Hikaru Higuchi, both of Nagasaki, and Takatomo Yamanaka, Yokohama, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

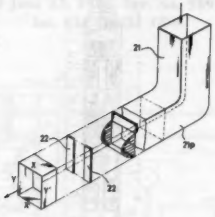
Filed Mar. 17, 1975, Ser. No. 558,858

Int. Cl.² G01F *1/36*

U.S. Cl. 73—211 6 Claims

1. A flow-measuring device, of the type in which the flow rate is derived from the pressure differential between pressures measured at the upstream and downstream sides of a

flow restricting mechanism throttling the fluid flow through a completely filled duct, for measuring the flow rate at a point downstream of a bend in a completely filled duct of rectangular cross-section, where the speed distribution becomes non-uniform, across the duct, in a direction parallel to the plane in which the duct is bent, due to such bend, said flow-measuring device, comprising, in combination, a flow restricting mechanism positioned at said point in said duct downstream of said bend; and respective pressure measuring taps communicating with said duct on the upstream and downstream sides of said



flow restricting mechanism; said flow restricting mechanism consisting of a pair of flat, substantially planar orifice plates fixedly mounted on respective opposite inner walls of said rectangular cross-section duct and extending inwardly toward each other, with the inner edges of said plates being rectilinear and in spaced parallel relation to each other, equidistant from said respective opposite inner walls of said duct, and within planes transverse to the direction of flow of fluid in said duct, the rectilinear inner edges of said orifice plates being parallel and symmetrical to the plane including said bend and extending along the center line of said duct.

3,998,098

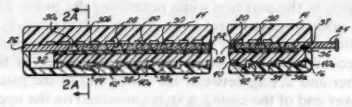
DISPOSABLE THERMOMETER

George Chilton, 144 Valley Road, Haworth, N.J. 07461

Filed Sept. 22, 1975, Ser. No. 615,491

Int. Cl.² G01K *11/12, 11/06*

U.S. Cl. 73—356 **8 Claims**



1. A disposable thermometer comprising:

an elongated housing defined by a rear portion and a transparent front portion having a plurality of cavities formed internally therein and along the length of said housing;

an elongated, thermally conductive carrier positioned in said housing, said carrier having a plurality of openings formed therethrough and positioned along the length thereof, a portion of said carrier being adapted to be placed in an orifice of the user's body;

temperature indicating means in each said opening of said carrier, said temperature indicating means being meltable at successively higher temperatures when said thermometer is in the orifice of the user's body;

compressible, elastomeric means positioned in opposition to each said opening of said carrier;

means for compressing said elastomeric means whereby said elastomeric means applies pressure to and forces the melted portions of said temperature indicating means through said openings and into said cavities; and

said means for compressing said elastomeric means comprising a slideable plunger integral with said carrier for longitudinally displacing said carrier, a slide coupled to said carrier for movement together therewith, said slide having cam means integral therewith, there being further included ramp means integral with said rear portion and confrontingly cooperating with said cam means whereby when said plunger is depressed said cam means traverses said ramp means to thereby exert a compressive force on said elastomeric means, said force being in a direction that is substantially perpendicular to the direcion of movement of said carrier whereby said melted temperature indicating means is forced into said cavities in said front portion.

3,998,099

EGG COOKING INDICATOR AND METHOD OF PRODUCING SAME

Duane G. Chadwick, 555 E. 3rd North, Logan, Utah 84321

Filed Aug. 28, 1975, Ser. No. 608,570

Int. Cl.² G01K *1/12*

U.S. Cl. 73—374 **2 Claims**

1. An egg cooking indicator comprising

a transparent closed housing;

a thermometer having a heat responsive end;

a backing member to which said thermometer is affixed;

insulating material carried by and surrounding the heat responsive end of the thermometer and said insulating material serving to affix the thermometer to the backing member; and

means suspending said thermometer in the housing whereby an air space substantially surrounds the insulating material carried by and surrounding the heat responsive end of the thermometer, and means comprising edges of the backing member and tabs bent from the backing member to engage sides of the thermometer and to extend beyond the thermometer into engagement with the wall of the housing.

3,998,100

EXERCISE PROCESS AND APPARATUS

Robert F. Pizatella, 909 Coleman Ave., and E. A. Johnson, 99 Sterling Road, both of Fairmont, W. Va. 26554

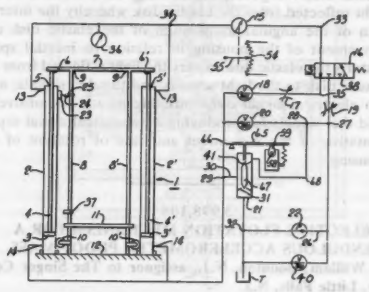
Filed Apr. 21, 1975, Ser. No. 569,691

Int. Cl.² G01L *5/02*

U.S. Cl. 73—379 **13 Claims**

1. Apparatus for use in muscular exercise including a supporting surface and an exercise apparatus mounted on said supporting surface, said exercise apparatus comprising: first means for operative engagement and movement by a portion of the person exercising for back and forth movement in opposite directions of positive and negative lift respectively between extreme portions within reach of said portion of said person exercising along a predetermined path of movement; second means operative when said first means is being moved

by said person exercising in at least one of said opposite directions, for simultaneously establishing a predetermined minimum of magnitude of muscular exertion required by the person exercising on said first means and a predetermined maximum rate of speed obtainable by said first means in a direction of exercise, assistance means becoming operative upon said



first means being moved in the direction of positive lift exercise by said person exercising at a rate of speed less than said predetermined rate to apply positive movement to said first means in the direction of exercise to meet said predetermined rate; and classical conditioning means responsive to said decrease for administering a disciplinary conditioning signal to said person exercising.

3,998,101

METHOD AND APPARATUS FOR SAMPLING THE ATMOSPHERE IN NON-HERMETICALLY-SEALED CONTAINERS

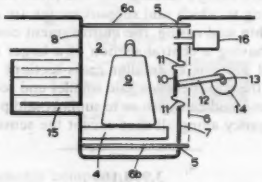
Robert Fagan Donat Bradshaw, Markyate, and Colin Frank Richardson Wainwright, Chesham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 31, 1975, Ser. No. 600,607

Claims priority, application United Kingdom, Apr. 30, 1975, 37795/75

Int. Cl.² G01N *1/22*

U.S. Cl. 73—421.5 R **31 Claims**



12. Apparatus for sampling the atmosphere in a non-hermetically-sealed container, the apparatus comprising a substantially-closable chamber of a size sufficient to envelop said container, means for cyclically varying the pressure within the chamber at a given repetition rate and within a given pressure range, and a sampling device so arranged as to sample the atmosphere within the chamber.

3,998,102

SUPPORT SYSTEM FOR A GAS SAMPLER

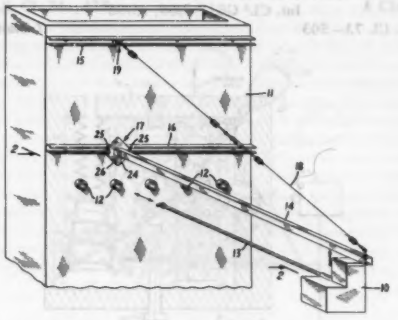
George M. Santorilla, Dearborn, Mich., assignor to Clayton Environmental Consultants, Inc., Southfield, Mich.

Filed Feb. 17, 1976, Ser. No. 658,572

Int. Cl.² G01N *1/22*

U.S. Cl. 73—421.5 R **6 Claims**

1. A support system for suspending a gas sampler from a wall having a plurality of laterally spaced ports from which samples are to be taken comprising a support rail extending outwardly from the wall for supporting the gas sampler for movement toward and away from the wall, an auxiliary support extending outwardly from the wall and connected to the



support rail at a distance remote from the wall, a pair of laterally extending tracks mounted to the wall for the support of the rail and auxiliary support and slidable couplings connecting the wall ends of the rail and the auxiliary support to the tracks to permit the gas sampler to be moved from port to port.

3,998,103

METERING APPARATUS AND METHOD

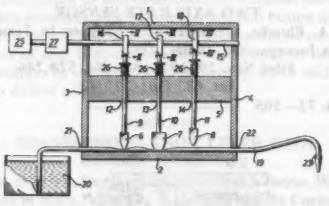
Knut Bertil Björklund; Knut Johan Björklund, and Tom Bertil Björklund, all of Appelviksvagen 26, 161 36 Bromma, Sweden

Filed Nov. 20, 1974, Ser. No. 525,302

Claims priority, application Sweden, Nov. 23, 1973, 7315920

Int. Cl.² B01L *3/02*; G01N *1/14*

U.S. Cl. 73—425.6 **11 Claims**

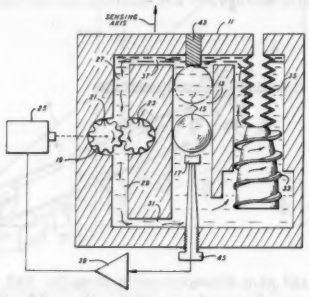


1. A method for accurately metering a liquid in precise increments which comprises admitting liquid to fill a chamber having inlet, outlet and intermediate collapsible positions, collapsing the inlet and outlet positions thereby to trap a determined increment of liquid in the intermediate position between the collapsed inlet and outlet positions, unloading the outlet position and expanding the same while it is in communication with the atmosphere through a discharge nozzle having an orifice thereby to suck in air through said nozzle into said chamber whereby any liquid which may have accumulated in said nozzle or at the orifice thereof is sucked back toward said chamber, and thereafter successively collapsing the intermediate and outlet positions to discharge through said nozzle a precisely determined increment of the liquid.

3,998,104
FLUID PRESSURE PULSED REBALANCED ACCELEROMETER

William Charles Albert, Boonton, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed June 30, 1975, Ser. No. 591,433
Int. Cl.² G01P 7/00, 15/08
U.S. Cl. 73—503 7 Claims

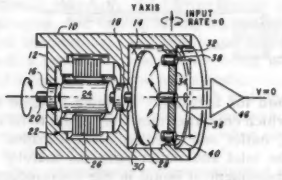


1. An accelerometer comprising:
a. a casing;
b. a bore formed in said casing;
c. a spherical proof mass of a diameter slightly smaller than said bore placed and free to slide within said bore;
d. a compliant switch disposed within said bore near one end and providing an output signal when contacted by said proof mass;
e. a fluid filling said bore;
f. a positive displacement rotary pump having its inlet and outlet in communication with spread parts of said bore, said pump having a shaft;
g. a restrictive flow passage in fluid communication with said bore and coupling the inlet and outlet of said pump;
h. a stepper motor having a shaft coupled to said pump shaft for driving said pump;
i. means coupling the output of said sensor and said stepper motor.

3,998,105
TWO AXIS RATE SENSOR

David A. Flusche, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 29, 1974, Ser. No. 528,246
Int. Cl.² G01C 19/42
U.S. Cl. 73—505 7 Claims

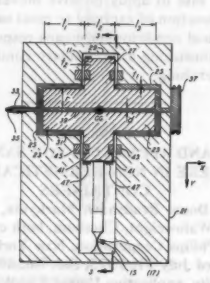


1. A rate sensor comprising:
a. a housing having at least one compartment, said housing adapted for connection to a carrier;
b. an elastic disk in said at least one compartment, a drive means including a motor and drive shaft coupled to said elastic disk for rotating said elastic disk for producing an angular momentum;
c. a pick-off means in the at least one compartment of the housing facing the elastic disk, said pick-off means including a light source positioned in axial alignment with the center of the elastic disk for uniformly illuminating the elastic disk when having a non-distorted angular momentum, and a plurality of light sensors mounted in selected spaced relationships to the light source and elastic disk for generating d.c. signals indicative of the light reflected from the elastic disk whereby the interaction of the angular momentum of the elastic disk and movement of the housing in relation to inertial space distorts the elastic disk to vary the light reflected from the elastic disk to the light sensors and the d.c. signals, and
d. an electrical signal differentiating means responsive to said d.c. signals for producing an electrical signal representative of the movement and rate of rotation of the housing.

3,998,106
SELECTIVE FLOTATION MECHANISM FOR A PENDULOUS ACCELEROMETER PROOF MASS

Albert William, Boonton, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed June 30, 1975, Ser. No. 591,434
Int. Cl.² G01P 15/08
U.S. Cl. 73—516 R 9 Claims



1. In a pendulous accelerometer in which a proof mass is supported by means rotatable about a pivot axis in response to an acceleration along a sensing axis, said proof mass contained within a casing to which said support means are attached and movable within said casing, the improvement comprising said proof mass having a central section of a larger cross-section and two end sections of smaller cross-sections and a liquid metal filling the gaps between said smaller end sections of said proof mass and said casing so as to support said proof mass for neutral buoyancy along all axes except the sensing axis.

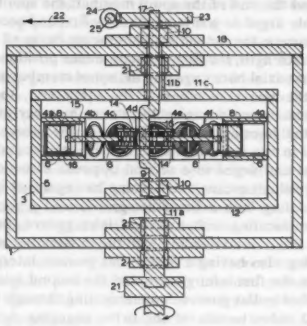
3,998,107
DEVICE FOR CONVERTING ROTARY MOTION INTO A UNIDIRECTIONAL LINEAR MOTION

Calvin I. Cuff, 135 Ocean Ave., Brooklyn, N.Y. 11225

Filed Oct. 29, 1974, Ser. No. 518,702
Int. Cl.² F16H 27/04
U.S. Cl. 74—84 S 2 Claims

1. In a device that converts rotary motion into unidirectional motion by varying the radius of gyration of a plurality of gyrating masses which device includes means for both supporting said plurality of gyrating masses and permitting sliding radial movement of said plurality of gyrating masses, and means for changing the direction of the resultant unbalanced force produced by the rotation of said plurality of gyrating masses in a plane which is perpendicular to the axis of rotation, the improvement comprising:
an axis of rotation;
a crank-like shaft mounted coaxially with respect to said axis of rotation and perpendicularly with respect to said

plane which contains said plurality of gyrating masses, said crank-like shaft having a single throw or crank, and said crank-like shaft being normally non-rotating relative to the housing or vehicle that contains said device that converts rotary motion into unidirectional motion; and



each of said plurality of gyrating masses being connected to said crank-like shaft by means which includes a connecting rod.

3,998,108

SERVOMOTOR

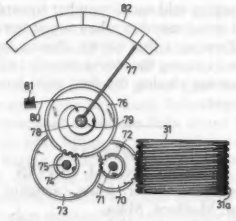
Jiri Vyskocil, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 31, 1975, Ser. No. 563,331

Claims priority, application Switzerland, Apr. 3, 1974, 4678/74

Int. Cl.² F16H 27/02

U.S. Cl. 74—89.15 **4 Claims**



1. A servomotor comprising

a housing;

an adjusting spindle mounted in said housing in non-rotatable relation thereto for axial movement;

a nut threadably mounted on said spindle for axial and rotatable movement relative to said spindle;

a transmission for rotating said nut, said transmission including a worm wheel secured to said nut for rotation therewith and for axial movement relative to said nut, and a rotatable worm gear meshing with said worm wheel for rotating said wheel an nut;

at least one spring mounted between said nut and said worm wheel to permit axial movement of said nut relative to said worm wheel under a restoring force; and

a position transmitter for indicating the axial movement of said spindle, said position transmitter having a pick-up including a sleeve fixed on said nut, said sleeve having an external screw thread of a pitch equal to the pitch of said nut.

3,998,109

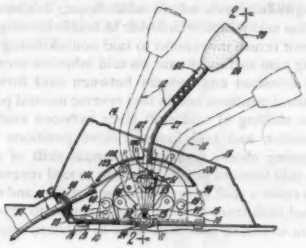
AUTOMATIC TRANSMISSION CONTROL LINKAGE

Patrick H. O'Brien, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 15, 1975, Ser. No. 613,331

Int. Cl.² G05G 1/02, 1/06, 5/06

U.S. Cl. 74—475 **6 Claims**



1. In a transmission control linkage; a support having a detent member; a lever, a handle end and a pivot end pivotally mounted on said support; detent means having a detent engaging portion, a detent rod mounted on said lever and biasing means biasing said detent engaging portion to engage said detent member and said detent rod toward the handle end of said lever; a hand grip member having a rigid core with a hand grip portion having a button bore open at the surface of the hand grip portion and an attaching portion secured to the handle end of said lever and said detent rod extending through said core into said button bore and a cover of resilient rubber like polymer material bonded to said core and having a displaceable portion, an annular cam and flat stop portion on said displaceable portion extending beyond said surface of said core and said cam and stop portion surrounding the open end of said button bore; a button having a annular tapered cam and flat stop portion and said cam and stop portions having cams engaging for expanding said cam and stop portion and displaceable portion of said cover while forcibly inserting said button in said button bore until said button cam and stop portion passes through said cover cam and stop portion and said cover cam and stop portion returns to normal position in which the flat stop portions on said button and cover engage to retain said button in detent engaged position; means connecting said button to said detent rod for conjoint movement; said biasing means biasing said detent rod and button normally to the outer detent engaged position and operative on manual movement of said button into said button bore to detent released position to move said detent rod to move said detent means to detent released position.

3,998,110

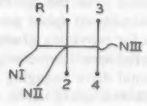
TRANSMISSION SHIFT LEVER WITH DETENT INHIBITOR

Patrick H. O'Brien, Birmingham, and Rizal J. Baysa, Washington, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 15, 1975, Ser. No. 613,330

Int. Cl.² G05G 5/02, 9/12

U.S. Cl. 74—476 **5 Claims**



1. In a transmission shift lever control; a support; a shift lever pivotally mounted on said support for selecting move-

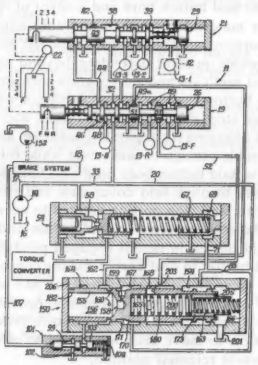
ment between a forward neutral position and a reverse neutral position and shifting movement transverse to said selecting movement from said reverse neutral position to reverse drive position and from said forward neutral position to forward drive positions and inhibitor means having an inhibitor member mounted on said shift lever for limited reciprocating movement between inhibiting and noninhibiting positions in the same direction as said selecting movement and transverse to the longitudinal axis of the shift lever, inhibitor spring means to bias said inhibitor member to said inhibiting position and to permit return movement to said noninhibiting position, cooperating cam surface means on said inhibitor member and support in constant engagement between said forward and reverse neutral positions and in said reverse neutral position to permit free shifting of said shift lever between said forward neutral position and said forward drive positions and said inhibitor spring means resisting a manual shift of said shift lever from said forward neutral position to said reverse neutral position to resist a shift to reverse drive position and operative on a manual shift from reverse drive position to reverse neutral position to return said shift lever to forward neutral position.

3,998,111

FLUID CIRCUIT FOR SHIFTING A TRANSMISSION

William W. Blake, Kewanee, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 24, 1975, Ser. No. 561,757
Int. Cl.² F16H *3/74, 57/10*
U.S. Cl. 74—752 C **6 Claims**



1. A hydraulic transmission control system for shifting a multi-speed transmission having a plurality of directional drive engaging devices and a plurality of speed engaging devices comprising:

A source of fluid pressure;

directional valve means for selectively energizing by fluid pressure one of a plurality of directional drive engaging devices;

speed valve means for selectively energizing by fluid pressure communicated from the directional valve means at least one of a plurality of speed drive engaging devices;

modulating means for providing gradual rises in fluid pressure to the selected speed drive engaging device and the selected directional drive engaging device; and

a differential check and safety valve;

the differential check and safety valve further comprising:

a housing defining a bore;

a spool member slidably contained in said bore, said spool member having a first end and a second opposite end and defining a first axial bore in the first end and a second axial bore in the opposite end;

a floating sleeve member slidably contained in the first axial bore defined at the first end of the spool member, said sleeve member having a cylindrical projection extending beyond the end of the spool member; the spool member slidably urged to a first position by first and second resilient means, the second resilient means being of relatively lesser strength, the first resilient means positioned within the first axial bore engaging the spool member at one end and the sleeve member at the other end, the second resilient means engaging the sleeve member at one end and the housing at the other end; the sleeve member urged in the same first direction by the second resilient means and urged in a second opposite direction by the first resilient means; the housing having a first inlet communicating with a first inlet groove and a second inlet communicating with a second inlet groove, the second inlet also communicating with the modulating means; the housing also having a first outlet groove, interposed between the first inlet groove and the second inlet groove, said first outlet groove communicating through the directional valve to one of the drive engaging devices; the housing further having a second outlet groove located on the other side of the first inlet groove from the first outlet groove, said second outlet groove vented through the directional valve means when the directional valve has energized one of the drive engaging devices; the housing also having a first drain groove located on the opposite side of the second inlet groove from the first outlet groove; the spool member further defining radial ports communicating the first outlet groove with the first axial bore; said spool member when in its first position engaging the end of the housing nearest the second outlet, simultaneously blocking the second inlet while forming passage means, said passage means providing communication from the first inlet groove to the second axial bore, the spool member further defining radial passages of larger dimension than said passage means, said radial passages communicating the second axial bore with the second outlet groove when the spool member is urged to its first position; and

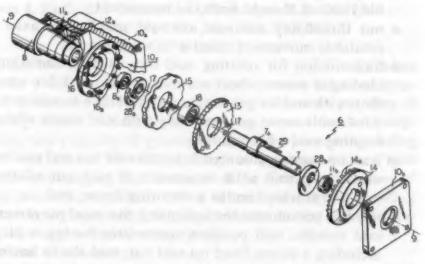
means for urging said spool member toward a second position, said spool member when urged toward said second position forming a first cavity, closing the second outlet groove and causing the sleeve member to engage the end of the housing closing the first axial bore from the first drain groove.

3,998,112

MECHANICAL DRIVES

Michel A. Pierrat, Andover, Mass., assignor to Compudrive Corporation, Medford, Mass.

Filed Dec. 6, 1974, Ser. No. 530,224
Int. Cl.² F16H *1/28*
U.S. Cl. 74—805 **6 Claims**



1. An orbital drive mechanism comprising two orbiting

gears having peripheral surfaces acting as teeth of different numbers, N_1 and N_2, respectively, means supporting said two orbiting gears for movements together eccentrically about an axis and angularly about their centers eccentric to said axis, two non-orbiting gears concentric with said axis and nested with said two orbiting gears, respectively, said non-orbiting gears having peripheral surfaces acting as teeth and meshed with said teeth of said orbiting gears, the predetermined maximum number of said teeth of the patterns of teeth for said non-orbiting gears each differing by one from the numbers of orbiting gear teeth, N_1 and N_2, respectively, one of each of the two meshed pairs of orbiting and non-orbiting gears having the teeth thereof in the form of lobes fixed integrally therewith, the surfaces of which lobes have continuous curvature and follow a continuous substantially epitrochoid curvature fully about the periphery of said one of said pairs of gears, the surfaces acting as the teeth of the other of each of the two meshed pairs of gears being of the same circular curvature with all the central axes of their circular curvature lying at a fixed radial distance from a given axis thereof and being located at angular positions of a predetermined pattern of equiangularly spaced tooth positions around said given axis, said lobes being contoured and disposed relative to said surfaces of circular curvature to develop substantially-continuous rolling - contact relationships between said lobe surfaces and surfaces of all the teeth of circular curvature at all times, and means restraining one of said non-orbiting gears from following angular movements of the orbiting gear meshed therewith, whereby, the ratio of angular velocity of said supporting means to angular velocity of the other of said non-orbiting gears about said axis is substantially to one

$$\frac{N_1 (N_2 + 1)}{N_1 - N_2}.$$

4. An orbital drive mechanism comprising housing members adapted to be joined together to form an enclosure for internal movable parts of said mechanism, bearing means for supporting an input shaft and an output shaft for rotation about a common axis of said enclosure with portions thereof accessible from without said enclosure to apply rotational input to and deliver rotational output from said shafts, respectively, said input shaft having a crankshaft portion for supporting a pair of planet gears thereon for orbital movements together about their centers eccentric to said axis, sets of cooperating gears each including an internal planet gear having external continuous curvature lobe-like teeth following a continuous substantially epitrochoid curvature fully about the periphery thereof and a sun gear fitting in surrounding relation to the planet gear and having surfaces of cylindrical curvature acting as internal teeth, said lobe-like teeth of the planet gear being contoured and disposed relative to said surfaces of cylindrical curvature to develop substantially-continuous rolling-contact relationships with all of said internal teeth at all times, said sets of cooperating gears each having a different number of lobe-like teeth for the planet gears thereof and having predetermined maximum numbers of internal teeth for the patterns of teeth of the cooperating sun gears which exceed by one the numbers of teeth of the planet gears, said sets of cooperating gears having dimensions rendering them physically interchangeable with one another within said enclosure, the planet gears of two of said sets having teeth of numbers N_1 and N_2, respectively, being supported by said crankshaft portion, means within said enclosure restraining one of the sun gears of said two sets from following angular movements of the planet gear meshed therewith, and means mounting the other of the sun gears of said two sets within said enclosure in angular driving relation to said output shaft about said axis, whereby the ratio of angular velocity of said input shaft to angular velocity of said output shaft about said axis is to one

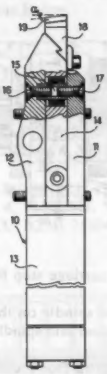
$$\frac{N_1 (N_2 + 1)}{N_1 - N_2}.$$

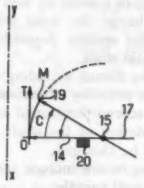
3,998,113

METHOD FOR MACHINING WITH A LATHE AND MORE PARTICULARLY FOR COPYING AND A TOOL-CARRIER MAKING IT POSSIBLE TO IMPLEMENT SUCH A METHOD

Bernard Guillermier, Route de Vignieres, Annecy le Vieux, France

Filed Aug. 28, 1974, Ser. No. 501,407
Claims priority, application France, Sept. 4, 1973, 73.31853
Int. Cl.² B23B 29/00, 3/00
U.S. Cl. 82—1 C 10 Claims





1. In a method for machining with a lathe and more particularly for copying, including the steps of driving the workpiece to be machined in rotation about an axis and driving the point of the tool, in relation to the axis, in two movements in a working plane passing through the said axis, the first movement being in two directions one of which is parallel to the said axis, and the second movement being a relative cyclic movement having a period of T and a slight amplitude in relation to the dimensions of the work-piece, the improvement wherein said cyclic movement comprises the following three phases:

a first phase I during which the point of the tool moves away from the work-piece starting from a point of origin O and reaching a maximum travel point M following a plane curve C whose tangent at the point of origin O is substantially parallel to the said axis,

a second phase I' during which the point of the tool comes back from the point of maximum travel towards the point of origin O following the curve C, and

a third phase J during which the point of the tool remains at the point of origin O.

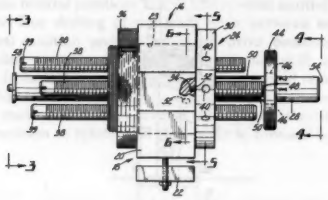
4. A tool carrier which may be installed on the trolley of a lathe, comprising:

two parallel guides (11, 12) fixed relative to the body (13) of the tool-carrier (10),

a mobile tool support (14) installed between the two guides (11, 12) for rotation about an axis (15) orthogonal to the guides (11, 12) and fastened at its ends to these guides,

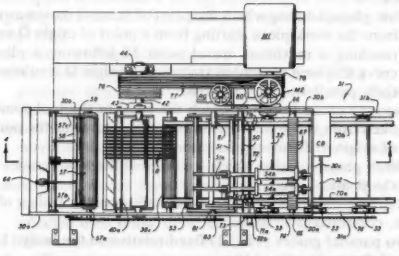
a stop (20) fixed to the body (13) of the tool-carrier (10),
a return means (21) for driving the tool support (14) back against the said stop (20), and
means (22) for periodically moving the said support (14) away from the said stop (20).

3,998,114
MULTI-POSITION CARRIAGE STOP
Arpad Nevery, 1577 Edgefield Road, Lyndhurst, Ohio 44124
Filed Sept. 5, 1975, Ser. No. 610,641
Int. Cl.² B23B 3/36
U.S. Cl. 82—34 D 5 Claims



1. A multi-position carriage stop for a lathe comprising,
a stationery spindle,
means to mount said spindle on the lathe,
a stop shaft mounted on said spindle for axial and rotational movement,
said shaft having stop surface means centered on the axis of rotation thereof positioned in the path of the carriage of the lathe when the device is mounted on the lathe,
cooperating means carried by said spindle and said shaft to selectively change the axial position of the shaft with respect to the spindle dependent upon the rotational position of said shaft,
said cooperating means including axially adjustable means comprising a plurality of circumferentially and radially spaced stop screws positioned around the shaft,
whereby by rotation of the shaft the stop position of the carriage can be changed,
said cooperating means include said axial adjustable means mounted on said spindle,
said cooperating means further including a collar carried by the shaft and having an engagement surface means disposed to coact with a selected one of said stop screws.

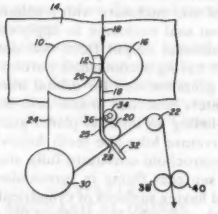
3,998,115
MUTLIPLE RIP-SAWING METHOD AND APPARATUS
Cyrus J. Cornell, P.O. Box 18, Laceyville, Pa. 18623
Filed Nov. 11, 1975, Ser. No. 630,818
Int. Cl.² B27B 5/00, 25/00
U.S. Cl. 83—56 18 Claims



1. In a wood saw assembly which includes a plurality of feed rolls adapted to feed a piece of wood through a gang of rotating circular saw blades carried on a motor-driven arbor, wherein said feed rolls are cascadedly interconnected in a series sequence by a plurality of endless drive chains to rotate in synchronism, and feed motor means are connected to rotate a first of said feed rolls of said series and through said drive chains to rotate the others of said feed rolls of said series, the combination of means for applying a retarding torque to a last of the feed rolls of said series, thereby to prevent forces imparted to said piece of wood by said saw blades from accelerating said piece of wood in the direction in which said piece is being fed by said feed rolls despite the presence of slack in one or more of said endless drive chains.

9. In the method of rip-sawing wood which comprises feeding a piece of wood forwardly through a gang of saw blades driven in a direction such that blade forces imparted to said piece of wood tend to urge said piece of wood forwardly, said step of feeding comprising rotatably driving at least one feed roll through a motion-transmitting mechanism to urge said piece of wood forwardly at a predetermined speed, the added step of applying a retarding torque to the motion-transmitting mechanism rotatably driving said feed roll to take up slack in said mechanism, thereby preventing blade forces which do not exceed said retarding torque from forwardly accelerating said piece of wood to a speed greater than said predetermined speed.

3,998,116
APPARATUS FOR REMOVING CUT PANELS FROM SHEET MATERIAL
Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.
Filed Mar. 3, 1975, Ser. No. 554,534
Int. Cl.² B26D 7/06
U.S. Cl. 83—98 8 Claims

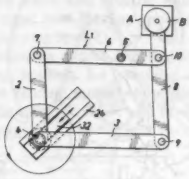


1. Apparatus for removing panels cut from a material conveyed along a path, comprising,
a rotatable panel cutter roll having a panel cutter die extending radially therefrom,
anvil means positioned adjacent to said panel cutter roll, said anvil means serving as a rigid backing member for said panel cutter die,
conveying means to convey said material between said panel cutter roll and said anvil means so that said panel cutter die upon rotation of said panel cutter roll periodically cuts a window and forms a panel having the configuration of said window in said material,
panel receiving means positioned adjacent to and downstream of said panel cutter, and
a source of negative pressure connected to said panel receiving means and arranged to provide a negative pressure on a surface of said material adjacent to said panel receiving means at a location downstream of said panel cutter, said negative pressure arranged to remove said panel from said windows and convey said panel through said panel receiving means.

3,998,117
CUTTING APPARATUS FOR A ROD OR WIRE MATERIAL

Kimiya Fujibayashi, 28-7, Sumiregaoka, Kohoku, Yokohama, Kanagawa, Japan

Filed Aug. 26, 1975, Ser. No. 607,807
Claims priority, application Japan, Sept. 4, 1974, 49-101579
Int. Cl.² B26D *3/16*
U.S. Cl. 83—199 **5 Claims**

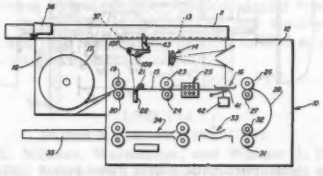


1. A cutting apparatus for a rod or wire material comprising:
a pair of cutting blades having planar surfaces and assembled in a sliding pair by contacting said surfaces so as to be able to slide on said surfaces and having cutting edge holes for receiving and cutting a workpiece;
a link mechanism connected at one end thereof to at least one of said cutting blades for imparting a gradually magnified arcuate motion to said at least one of said cutting blades; and
a means connected to the other end of said link mechanism for driving said link mechanism by simultaneously gradually shifting said other end of said link mechanism lineally while said drive means is rotating.

3,998,118
ROLL FED COPIER

William R. Brophy, West Simsbury, and Richard G. Dolson, Canton, both of Conn., assignors to Royal Business Machines, Inc., Hartford, Conn.

Continuation of Ser. No. 522,319, Nov. 8, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,270
Int. Cl.² G03G *15/00;* **B26D** *5/20*
U.S. Cl. 83—205 **10 Claims**

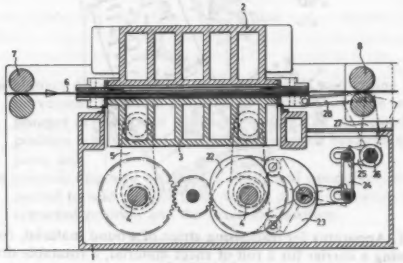


1. In a copy machine having a frame,
a roll of copy paper supported on said frame,
a pair of frame supported feed rolls for moving copy paper from said roll, said feed rolls having an entry side and an exit side,
a stationary knife and a normally uncocked movable knife positioned on the exit side of said feed rolls,
a spring connecting said movable knife to said frame,
a motive source,
a depressible copy control means for initiating a copy cycle,
first means responsive to a first depression of said copy control means for energizing said motive source,
a knife cocking and paper feed shaft,
a single revolution clutch engageable in direct response to each depression of said copy control means for coupling said energized motive source and shaft,
means on said shaft for moving said movable knife against said knife spring to a cocked position,
means to latch said movable knife in cocked position whereby copy paper fed by said feed rolls may move between said stationary and cocked knives,
means coupling said shaft to drive said feed rolls after said movable knife has been cocked and latched,
and means on said frame responsive to the trailing edge of an original to be copied for releasing said latch means to enable said movable knife to cut copy paper between said stationary and movable knives.

3,998,119
PROCESS AND APPARATUS FOR PUNCHING SHEETS OR WEBS OF PAPER, CARDBOARD OR SIMILAR MATERIAL

Friedrich Schröter, Am Waldchen 8, 3004 Isernhagen NB-Sud, Germany

Division of Ser. No. 418,130, Nov. 21, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,525
Int. Cl.² B23D *25/04*
U.S. Cl. 83—328 **4 Claims**



1. In apparatus for cutting a pattern in a continuously moving sheet or web of material including a frame, means associated with said frame for advancing said material through said apparatus, a tool unit movably mounted to said frame for longitudinal reciprocation to and fro along the direction of advancement of said material through said apparatus, tool unit actuating means mounted to said frame and formed to selectively cause said tool unit to engage said material, and drive means operatively connected to said tool unit to reciprocate said tool unit in synchronism with the speed of advancement of said material through said apparatus and operatively connected to said tool unit actuating means to cause said tool unit to engage said material while in synchronism therewith, the improvement comprising:
said tool unit is formed as an assembly having a mass substantially less than the mass of said tool unit actuating means, and said assembly including a frame carrying a lightweight elongated cutting die defining the shape of the pattern and a pair of plates of relatively thin cross-section as compared to the cross-section of said tool unit actuating means, said plates being positioned on either side of said material between said tool unit actuating means and said tool unit to distribute and transmit cutting forces to said cutting die when supported by said tool unit actuating means, said tool unit being incapable of sustaining the bending moments produced by the cutting forces;
said tool unit actuating means is formed as a pair of bending moment sustaining platens positioned on opposite sides of said material and tool unit and having a high mass as compared to said tool unit, at least one of said platens being mounted to said frame for selective reciprocation in

a direction transverse to the direction of advancement of said material through said apparatus, said bending moment sustaining platens being further formed to engage and uniformly support substantially the entire area of said cutting die during urging of said cutting die into engagement with said material for support of forces during cutting of said material by said bending moment sustaining platens.

3,998,120

APPARATUS FOR THE SIMULTANEOUS DISTRIBUTION AND CUTTING OF STRIPS OF ROLLED MATERIALS

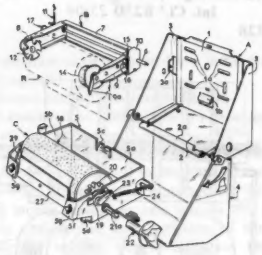
Maurice Granger, Saint-Etienne-Loire, and André Lerond, Villeurbanne-Rhone, both of France, assignors to Sebas S.A. Societe d'Exploitation d'Appareils Sanitaires, Geneva, Switzerland

Filed Apr. 2, 1975, Ser. No. 564,358

Claims priority, application France, Apr. 5, 1974, 74.12888; Dec. 4, 1974, 74.43618

Int. Cl.² B26D *1/38*

U.S. Cl. 83—335 **13 Claims**



1. Apparatus for dispensing strips of wound material, comprising a carrier for a roll of sheet material, a rotatable drum in abutting relationship with said roll of sheet material, a cutting device for said material comprising a fixed member with means for adjusting said fixed member and a movable member, said movable member cooperating with said fixed member to effect cutting mounted on said drum, means to latch the drum onto the vertical end walls respectively of a wall-mounted casing for said apparatus, a stepped shaft which extends through such drum and engages resiliently in apertures in hooked tongues on flanges of said casing and a supporting unit latched on to the horizontal base and end walls of said casing for said apparatus, projection means with which a lower portion of a flange frame is formed, such projections engaging beneath a folded edge of the base of the casing, and a coupling with which the end wall of such frame is formed, such coupling engaging beneath an inner hook with which the vertical wall of the casing is formed and assembled in a wall-mounted casing having a hood, a pawl of sectional shape to coact with a shock-absorbing member of said drum and an anti-return dog on the drum.

3,998,121

MITER CUTTING SAW

James C. Bennett, Calabasas Park, Calif., assignor to B & E Products, Inc. and Ralph Sadler Rosen, both of Los Angeles, Calif.

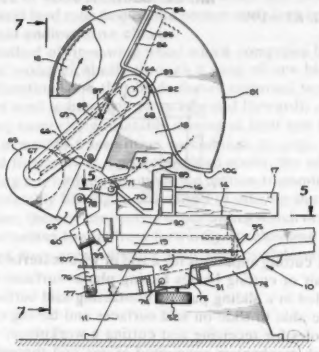
Filed Feb. 3, 1976, Ser. No. 654,933

Int. Cl.² B27B *5/18;* **B23D** *45/14*

U.S. Cl. 83—471.3 **12 Claims**

1. In a power operated miter saw comprising a stationary frame, a horizontal work table on said frame having a miter station intermediate opposite ends, a saw positioning turntable structure having a pivotal mounting on said frame on a vertical axis at said miter station, a saw platform having a tiltable mounting on said positioning structure on a horizontal axis and a manual actuator for said platform accessible from the front of the frame, the combination of

a reference plate having a stationary mounting on said frame concentric with said miter station and having a circular perimetrical edge spanning the work table and with an angle measurement scale extending over part of



said perimetrical edge, said positioning structure comprising a work supporting plate overlying said reference plate, an indexing structure underlying said reference plate and a releasable trigger cooperable respectively with said indexing structure and said scale for setting the angle of said saw platform, and an annular bearing element between said plates adjacent the perimeters.

3,998,122

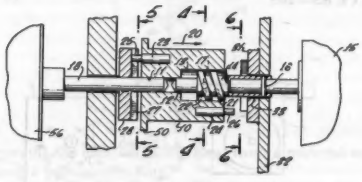
ELECTRO-PNEUMATIC ACTION FOR PLAYER PIANO

Richard L. Carty, 408 The Strand, Manhattan Beach, Calif. 90266, and Iver F. Becklund, 1772 Curtis Ave., Manhattan Beach, Calif. 90026

Filed Apr. 28, 1975, Ser. No. 572,468

Int. Cl.² G10F *5/06*

U.S. Cl. 84—125 **7 Claims**



1. An electropneumatic player piano action comprising

an electric motor having an output shaft;

a spool box including a tracker bar, take-up spool, and journal means for mounting a piano roll on a removable rewind spool;

means for coupling the output shaft of said electric motor to said take-up spool so as to cause said take-up spool to be engaged and rotated when said electric motor is operated in one direction, and;

means for coupling the output shaft of said electric motor to rotate a removable rewind spool when said electric motor is rotated in the opposite direction; and

a pneumatic stack;

means for producing a vacuum to operate said pneumatic stack; and wherein said take-up coupling means and said rewind coupling means comprises:

rewind gear means for turning said take-up spool;

a worm gear attached to the output shaft;

a traveling housing having an internal bore sufficient to accommodate said worm gear, and at least one circular exterior cross section;

means for coupling said worm gear to said traveling housing so as to cause said traveling housing to translate in one direction when said electric motor is engaged to rotate clockwise, and in a second opposite direction when said electric motor is engaged to rotate counterclockwise;

take-up spool engaging means attached to one end of said traveling housing for coupling said take-up spool to said electric motor when said electric motor is rotated in a direction to cause said take-up spool engaging means to engage said take-up spool;

rewind spool engaging means attached to the other end of said traveling housing for coupling said rewind gear means to said electric motor when said electric motor is rotated in a direction to cause said rewind spool engaging means to engage said rewind gear means.

3,998,123

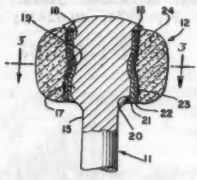
MALLETS FOR PLAYING UPON MUSICAL INSTRUMENTS

Fred D. Hinger, Leonia, N.J., assignor to Hinger Touch-Tone Corporation, Leonia, N.J.

Filed Dec. 30, 1974, Ser. No. 537,484

Int. Cl.² G10D *13/00*

U.S. Cl. 84—422 S **15 Claims**



10. For a musical instrument mallet, a shaft with a hand-grip-end and a head-end, and longitudinally-spaced-apart rigid retaining devices, adjacent the head-end and adapted to cooperate with a yieldable playing head to prevent dislodgment of such a playing head lengthwise of the shaft under normal playing action, but the innermost of said devices being configured to permit forced passage of such a playing head thereover and wherein said shaft including said hand-grip end, head-end and rigid retaining devices are formed as a single, one-piece integral member.

3,998,124

BOMB RACK ARMING UNIT

Thomas E. Milhous, Warminster, and William J. Halpern, Langhorne, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 2, 1975, Ser. No. 583,344

Int. Cl.² F41F *5/02*

U.S. Cl. 89—1.5 D **4 Claims**

1. An arming unit, for selectively retaining or releasing an arming wire ball, comprising:

a jaw housing;

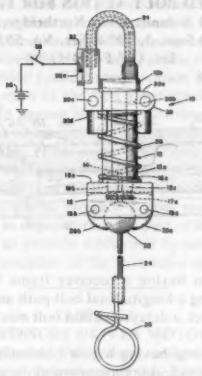
a pair of juxtaposed jaws pivotally mounted within said jaw housing;

bias means interconnecting said jaws for urging said jaws toward a ball retaining position;

a reaction plate having an aperture therethrough;

a cylindrical casing extending through said aperture, having a lower end secured to said jaw housing and having an upper end provided with an enlarged diameter flange;

a compression spring circumposed about said casing, said spring having a lower end which abuts the upper side of the jaw housing and an upper end which abuts the lower side of said reaction plate, said spring normally urging said cylindrical casing flange into abutment with the upper side of said reaction plate;



a plunger disposed within the lower end of said casing for movement between a retracted position wherein said plunger is positioned within the casing and an extended position wherein said plunger is positioned between said jaws; and

a solenoid disposed within said casing and operatively connected to said plunger to move said plunger between the retracted position and the extended position.

3,998,125

BELT FEEDER FOR AN AUTOMATIC WEAPON

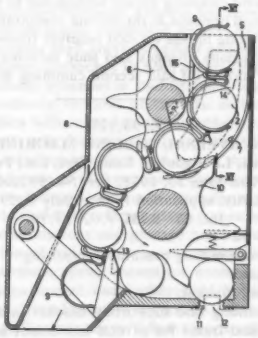
Rolf Hartmann, Dusseldorf, Germany, assignor to Rheinmetall G.m.b.H., Dusseldorf, Germany

Filed July 29, 1974, Ser. No. 492,874

Claims priority, application Germany, Aug. 3, 1973, 2339311

Int. Cl.² F41D *9/02*

U.S. Cl. 89—33 CA **3 Claims**



1. A belt feeder for loading an ammunition belt into an automatic weapon having a feeder starwheel driven stepwise in dependence on the weapon function comprising an ammunition-belt inlet-chute progressively narrowing in a substantially spiral fashion and encompassing said feeder starwheel

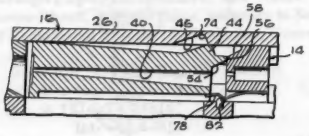
over about 90°, said cartridges being unstrapped from said belt prior to entering said weapon, and a transport starwheel in a plane parallel to that of said feeder starwheel and synchronously driven therewith, said starwheels engaging each other via a belt-strapped cartridge.

3,998,126

DELAYED BOLT ACTION FOR FIREARM

Ross Rudd, 9301 Yolanda Ave., Northridge, Calif. 91324

Filed Sept. 3, 1974, Ser. No. 502,541
Int. Cl.² F41D *11/06*
U.S. Cl. 89—184 **7 Claims**



1. In a firearm having a receiver frame having walls and shoulders defining a longitudinal bolt path and equipped to be fitted with a barrel, a delayed action bolt mechanism, comprising:

a. a bolt member having a pair of camming surfaces and disposed for slideable movement along a longitudinal axis along said walls and guide shoulders in the receiver frame between a closed breach position and an open breach position, first and second opposed camming surfaces on said bolt, said bolt having a shoulder on the end thereof;

b. camming means on the receiver frame forming a camming surface disposed for engaging said first camming surface on said bolt member and for exerting a force thereagainst having a first component opposing the movement of said bolt member from the closed breach position toward the open breach position and a second component orthogonal to the longitudinal axis so that said bolt moves away from said camming means as it moves toward the open bolt position; and

c. a slide member disposed for slideable movement along said walls and guide shoulders in the receiver frame and having a camming surface disposed for engaging said second camming surface on said bolt member and for exerting a force thereagainst having a first component opposing the movement of said bolt member from the closed breach position toward the open breach position and a second component to move said slide member off said second camming means orthogonal to the longitudinal axis and opposed to the second component of force of said camming means on said receiver frame so that said shoulder axially engages said slide member as said slide member moves off said second camming means.

3,998,127

UNIVERSAL MILLING MACHINE

Ramon Romeu, La Rigoulde, Saint-Cere, Lot, France

Filed June 30, 1975, Ser. No. 592,003
Claims priority, application France, July 1, 1974, 74.22834
Int. Cl.² B23C *1/027*, *1/14*
U.S. Cl. 90—14 **13 Claims**

1. A universal milling machine comprising:

a fixed frame,

a supporting bracket;

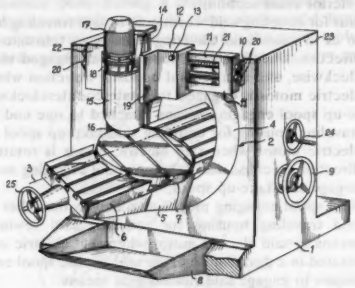
means mounting said supporting bracket in a central portion of said frame for pivotal movement about an axis, fixed with respect to said frame;

a workpiece-holder table;

means mounting said workpiece-holder table on said bracket for longitudinal translation in a direction fixed with respect to said bracket and parallel to said axis;

a tool-holder casing; and

means mounting said tool-holder casing in an upper portion of said frame;



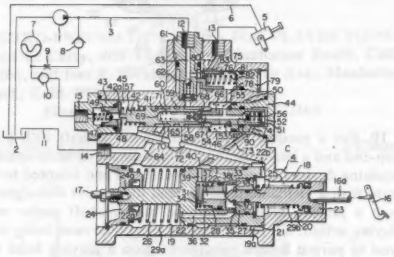
wherein said axis of pivotal movement of said bracket is above said table.

3,998,128

HYDRAULIC POWER BOOSTER SYSTEM

Yoshiharu Adachi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Apr. 29, 1975, Ser. No. 572,646
Claims priority, application Japan, May 24, 1974, 49-59160; May 31, 1974, 49-62432; Nov. 22, 1974, 49-134531
Int. Cl.² F15B *13/04*
U.S. Cl. 91—29 **10 Claims**



1. A hydraulically operated power booster system comprising:

a. a hydraulic pressure source;

b. a hydraulic pressure reservoir;

c. power cylinder means;

d. power piston means positioned in said power cylinder means;

e. power pressure chamber means defined in said power cylinder means at one side of said power piston means;

f. orifice means disposed between said hydraulic pressure source and said hydraulic pressure reservoir and having opening means for normally allowing unrestricted flow of hydraulic fluid from said hydraulic pressure source to said hydraulic pressure reservoir;

g. manually operated means for restricting said opening means for establishing a hydraulic pressure drop thereacross;

h. a flow divider disposed between said hydraulic pressure source and said orifice means; and

i. first control valve means having spool means, shiftable in response to hydraulic pressure established on the upstream side of said orifice means in a chamber defined by said first control valve means, for introducing hydraulic pressure from said hydraulic pressure source into said

power pressure chamber means, and wherein said chamber receives a flow of hydraulic fluid from said flow divider, the flow of hydraulic fluid from said chamber being restricted for establishing hydraulic pressure therein when the manually operated means cooperates with said opening means of said orifice means for establishing the hydraulic pressure drop thereacross.

3,998,129

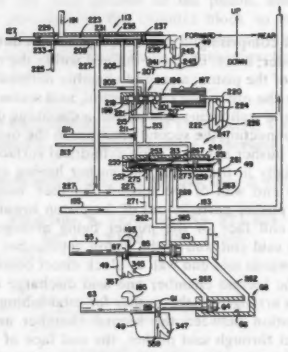
MODULAR LIQUID PROPELLANT GUN

Thomas M. Broxholm, Palo Alto, and Lester C. Elmore, Portola Valley, both of Calif., assignors to Pulsepower Systems, Incorporated, San Carlos, Calif.

Division of Ser. No. 104,610, Jan. 7, 1971, Pat. No. 3,800,657. This application Jan. 14, 1974, Ser. No. 433,200

Int. Cl.² F15B *13/042, 21/02*

U.S. Cl. 91—39 **1 Claim**



1. A fluid powered actuator system, said system comprising an actuator motor, a source of pressurized fluid for powering the actuator motor, and a control valve operatively associated with the source of pressurized fluid and the actuator motor for producing in a first mode of operation cyclic reciprocation of the motor in response to reciprocation of the control valve and for producing in a second mode of operation retention of the motor in a fixed position in response to reciprocation of the control valve, said control valve having a valve body, a first valve spool mounted for limited reciprocation within the valve body, and a second valve spool in the form of a sleeve encircling a central portion of the first valve spool and mounted for limited reciprocation with respect to both the valve body and the first valve spool, first seal means between the outer periphery of the sleeve and the valve body, second seal means between the inner periphery of the sleeve and the central portion of the first valve spool, first and second abuttment means connected to opposite ends of the first valve spool for engaging corresponding first and second end faces of the sleeve to control the position of the sleeve and defining respective expansible control chambers therebetween when the sleeve is shifted to place an end face against a related one of the abuttment means, a first control port in the valve body for transmitting the pressurized fluid into one of said control chambers to the second end face of the sleeve to shift the sleeve to place the first end face against the first abuttment means in said first condition of operation of the control valve, a second control port in the valve body for transmitting the pressurized fluid into the other of said control chambers to the first end face of the sleeve to shift the sleeve to place the second end face against the second abuttment means in said condition of operation of the control valve, bias inlet and exhaust control valve means for directing the pressurized fluid to the first control port while opening said second control port to exhaust and effective to retain said first face in engagement with the first abuttment means during the first mode of operation and for directing the pressurized fluid to the second control port while opening said first control port to exhaust and effective to retain said second face in engagement with the second abuttment means during the second mode of operation, reciprocating means for cyclically reciprocating the first valve spool and the sleeve as a unit back and forth in the valve body in both the first mode of operation and in the second mode of operation, land and groove means on the outer periphery of the valve sleeve, and flow ports in the valve body so located with the land and groove means as to alternatively direct the pressurized fluid flow to opposite ends of the actuator motor to produce cyclical reciprocation of the motor with cyclical reciprocation of the first valve spool when said first end face is shifted against said first abuttment means during the first condition of operation and to direct pressurized fluid flow to one end only of the motor when said second end face is shifted against said second abuttment means in the second condition of operation of the control valve, whereby the control valve is effective to produce a dual mode of operation without the need to depressurize any part of the fluid-powered actuator system, to provide additional by-pass circuits, or to discontinue reciprocation of the first valve spool.

3,998,130

PRESSURE DRIVEN MOTOR

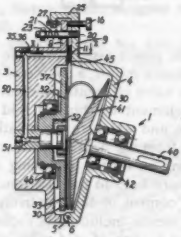
Georg Hirmann, Zurich, Switzerland, assignor to Inventa AG fur Forschung und Patentverwertung, Zurich, Switzerland

Filed May 15, 1975, Ser. No. 577,865

Claims priority, application Switzerland, May 21, 1974, 6958/74

Int. Cl.² F01B *13/04;* **F01C** *21/12*

U.S. Cl. 91—59 **8 Claims**



1. A motor having an output shaft, the motor adapted to be driven by a pressure medium wherein the flow of pressure medium is automatically controlled by the torque requirements of the output shaft comprising first and second housing portions pivotably connected to each other, first and second members rotatably mounted in said first and second housing portions respectively, the axes of said first and second members being offset with respect to one another, inflatable and deflatable fluid cells between said members for rotatably coupling said members together, said output shaft being rotatably mounted in one of said members, pressure medium passage means between said housing portions for supplying pressure medium to said fluid cells, pinching means on one of said housing portions adjacent said passage means for controlling the cross section of said passage means available for the flow of pressure medium, spring means for normally urging said housing portions toward each other, said housing portions being relatively movable apart from each other against said spring means to increase the said flow cross section to permit the greater amount of pressure medium to flow to said fluid cells in response to an increase in torque on said output shaft, and towards each other to decrease the said flow cross section to decrease the flow of pressure medium to said fluid cells in response to a decrease in torque on said output shaft, means for limiting the maxium flow cross section of said passage

means, and means for limiting the minimum flow cross section of said passage means.

3,998,131

ROTARY VALVE FOR POWER STEERING WITH HYDRAULIC REACTION

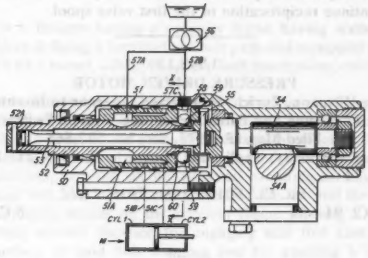
Frederick John Adams, Campton, England, assignor to Cam Gears Limited, Hitchin, England

Continuation-in-part of Ser. No. 437,930, Jan. 30, 1974. This application July 10, 1974, Ser. No. 486,994

Claims priority, application United Kingdom, July 18, 1973, 34230/73

Int. Cl.² F15B 9/10

U.S. Cl. 91—372 5 Claims



1. A hydraulic power assisted vehicle steering system comprising an assistance motor, a source of pressure fluid, a valve comprising two valve elements which are relatively rotatable, a torsion bar element for biasing said valve elements to a neutral position and which resists relative movement of said valve elements from the neutral position, said source of pressure fluid having an output including a first output branch supplying pressure fluid to the assistance motor through and subject to the control of the relatively rotatable valve elements, detent means including a radially shiftable element movably carried by one of said valve elements and adapted, when subjected to fluid pressure to be urged radially,

formations defining an opening on said one of said valve elements and a recess in another of said elements, said opening and recess cooperatively acting to engage with said radially shiftable element, said source of pressure fluid having a second output branch communicating with said source pressure and supplying pressure fluid to said radially shiftable element to urge said radially shiftable element in a radial direction to inhibit relative rotation between the two valve elements by reason of interengaging surface profiles of the radially shiftable element and said recess in said another element,

said valve being of the type which controls fluid flow such that the source output pressure is minimal when the valve elements are in their neutral position and increases with increasing relative rotation of said valve elements away from their neutral position, said interengaging surface profiles of said radially shiftable element and said recess in said another element defining cam-like surfaces designed to control the resistance of the valve elements to the relative rotation therebetween as a function of the source output pressure and tending to convert increased radial movement of said radially shiftable element as a result of increased pressure in said second branch into increased resistance to relative rotational movement of said valve elements.

3,998,132

JACKS

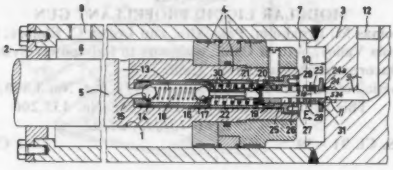
Herve Pierre Rasigade, Compiegne, France, assignor to Societe Anonyme: Poclain, Le Plessis-Belleville, France

Filed Oct. 14, 1975, Ser. No. 622,041

Claims priority, application France, Oct. 21, 1974, 74.35342

Int. Cl.² F15B 15/22

U.S. Cl. 91—395 3 Claims



1. A jack comprising: a cylinder; a piston mounted to slide in the cylinder; a first chamber defined within the cylinder on a first side of the piston; a second chamber defined within the cylinder on the other side of the piston; said second chamber having an end wall facing said piston; a discharge duct in said end wall connecting the second chamber to the outside of the cylinder; a pusher having a main cylindrical surface mounted to slide axially in the piston, the pusher having an end face facing said end wall of the second chamber, biasing means urging the pusher partially out of the piston toward said end wall, said end face of the pusher being arranged to bear against the said end wall as the piston approaches the end of a stroke towards said end wall to block direct communication between the second chamber and said discharge duct, aperture means arranged in the pusher for establishing secondary communication between the second chamber and the discharge duct through said pusher, the end face of the pusher having a diameter that is less than the diameter of said main cylindrical surface so that the effect of the pressure of the fluid contained in the second chamber creates a resultant force on said pusher opposite to the force of said biasing means, said resultant force being sufficient when said end face is bearing against said end wall and the pressure reaches a predetermined value to move the end face of the pusher out of contact with the said end wall to move the pusher and establish direct communication between the second chamber and the discharge duct to lower the pressure in said second chamber.

3,998,133

RADIAL TYPE HYDRAULIC PUMP MOTOR

Masatake Kuroki, Yono, Japan, assignor to Sanwa Seiki Mfg. Co. Ltd., Japan

Filed Nov. 5, 1975, Ser. No. 629,069

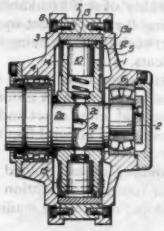
Claims priority, application Japan, Nov. 14, 1974, 49-130471

Int. Cl.² F01B 13/06

U.S. Cl. 91—488 3 Claims

1. A radial type hydraulic pump motor comprising a rotating cylinder block and a drum case rotating eccentrically with respect to said cylinder block, said cylinder block being rotatably mounted on an eccentric shaft and having a plurality of cylinder chambers radially provided therein, and a like plurality of pistons inserted in said cylinder chambers and slidably movable inward or outward relative to said eccentric shaft, said piston having at the head portion a concave or convex spherical surface, with which is engaged a piston shoe having a complimentary convex or concave spherical surface at an inner side and a planar surface at an opposite side, a crescent-shaped segment having a curvature equal to the inner peripheral surface of the drum case is interposed between said piston shoe planar surface and the inner peripheral surface of the drum case, said piston shoe having in the central portion of the

planar surface a hydraulic recess having an area substantially equal to the effective pressure receiving area of the piston, said recess communicating with the cylinder chamber through a passageway provided in the piston shoe and a passageway



provided in the head portion of the piston, and retaining means are provided on the cylinder block to engage said crescent-shaped segment for regulating the movement of the segment in both radial and circumferential directions relative to the drum case.

3,998,134

LOAD RESPONSIVE FLUID CONTROL VALVES

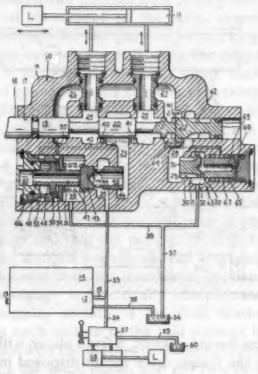
Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022

Continuation-in-part of Ser. No. 377,044, July 6, 1973, Pat. No. 3,882,896

Filed Nov. 8, 1974, Ser. No. 522,324

Int. Cl.[2] F15B *13/04*, *13/06*

U.S. Cl. 91—412 **49 Claims**



1. A valve assembly comprising a housing having a fluid inlet chamber, first and second load chambers, outlet fluid conducting means and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said fluid inlet chamber and said fluid exhaust means through said outlet fluid conducting means, a variable metering orifice means in said outlet fluid conducting means and operable to throttle fluid flowing between said load chamber and said fluid exhaust means when said load chamber and said fluid exhaust means are interconnected by said first valve means, a second valve means in communication with said fluid inlet chamber, said second valve means having means responsive to pressure upstream of said variable orifice means in said outlet fluid conducting means and operable to maintain said upstream pressure at a relatively constant level when one of said load chambers is interconnected by said first valve means to said variable orifice means.

3,998,135

BAG STRUCTURE AND METHOD OF PRODUCING

Cassius E. Sargent, Chicago, Ill., assignor to PPC Industries, Inc., Wheeling, Ill.

Continuation of Ser. No. 482,745, June 24, 1974, abandoned, which is a division of Ser. No. 319,861, Dec. 29, 1972, abandoned, which is a continuation-in-part of Ser. No. 143,889, May 17, 1971, Pat. No. 3,762,628, which is a continuation-in-part of Ser. No. 143,895, May 17, 1971, Pat. No. 3,708,106. This application Apr. 10, 1975, Ser. No. 566,925

Int. Cl.[2] B31B *1/60*

U.S. Cl. 93—35 R **2 Claims**

1. A method of producing a coupon-confining bag comprising advancing two continuous flexible transparent thermoplastic webs toward a folding member with one web being wider than the other, inserting coupons sequentially between said webs, orienting said webs in superposed relation, longitudinally uniting said webs along a first longitudinal line adjacent an edge of the other web, longitudinally folding said one web along a second longitudinal line spaced from said first longitudinal line to form a bag from said one web, and transversely sealing said webs between sequential coupons.

3,998,136

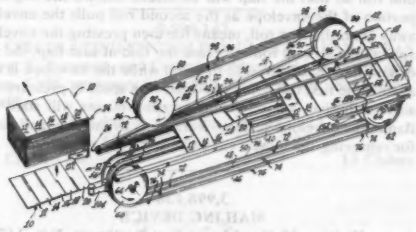
HIGH SPEED PARTITION ASSEMBLING METHOD AND APPARATUS

Charles L. Peters, Jr., Norco, Calif., assignor to Box Innards, Inc., Anaheim, Calif.

Filed Jan. 19, 1976, Ser. No. 650,246

Int. Cl.[2] B31B *11/02*, *1/00*

U.S. Cl. 93—37 R **11 Claims**



11. The method of forming container partitions in collapsed condition comprising the steps of:

providing first and second sets of stacked parallel strips wherein each strip has slots in one edge to provide a number of tabs;

positioning the sets of strips with their tabbed edges confronting each other;

manipulating the tabs of the strips of first set so that the tabs of each strip extend into a respective plane;

positioning the strips of said second set in different planes with all tabs of each strip of said second set extending into the same plane, and wherein each of such different planes is between adjacent ones of the respective planes in which the tabs of the strips of said first set extend;

individually moving the strips of said first and second sets in a direction at right angles to the slots therein, with the strips of the respective sets overlapped so that each strip trails the preceding one by one tab width, and with each slot in each strip of one set aligned with a respective slot in a strip of the other set;

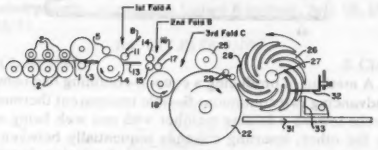
and directing one of said sets of strips at an angle with respect to the other set during their said movements to cause the tabs of both sets to progressively overlap and intersect until the end edges of the tabs of each set are coplanar with the unslotted edges of the strips of the other set.

3,998,137

ENVELOPE MAKING MACHINE

Hans J. Seipel, Boardman, Ohio, assignor to American Paper Products Company, Youngstown, Ohio

Filed May 5, 1975, Ser. No. 574,516
Int. Cl.² B31B *1/26*
U.S. Cl. 93—61 R **3 Claims**



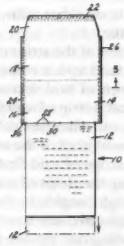
1. In a machine for making three-layer envelopes from paper blanks, a first rotating roll provided in its periphery with a row of vacuum holes extending lengthwise thereof, means for reducing the air pressure in said holes to hold against the roll the previously folded leading edge of a twice folded traveling envelope having an unfolded closing flap at the trailing edge of the side of the envelope remote from the roll, a second roll beside the first roll and rotating in the opposite direction, the second roll being provided in its periphery with a row of vacuum holes extending lengthwise thereof, means for reducing the air pressure in said last-mentioned holes to hold the outer surface of said flap against the second roll as the first roll carries the envelope between the two rolls, atmospheric pressure being restored to said holes in the first roll to release the envelope therefrom when said flap becomes held by the second roll so that the flap will be folded behind the adjoining portion of the envelope as the second roll pulls the envelope away from the first roll, means for then pressing the envelope against the second roll to crease the fold at said flap, the side of said flap that faces said first roll while the envelope is held against the first roll being provided with spots of pressure-sensitive adhesive, whereby said pressing means will stick said flap to the envelope surface overlapped by the flap, and means for removing the closed envelope from the second roll.

3,998,138

MAILING DEVICE

Aaron Walters, 10 Coral Lane, East Northport, N.Y. 11731

Continuation-in-part of Ser. No. 458,807, April 8, 1974, abandoned. This application May 5, 1975, Ser. No. 574,412
Int. Cl.² B31B *49/04*
U.S. Cl. 93—61 R **6 Claims**



1. A method of forming a mailing device consisting of an envelope containing a separate letter sheet from a preprinted integral form comprising a letter sheet and an envelope sheet joined along a transverse line which comprises:

a. cutting said pre-printed form into an integral letter-envelope combination with an integral flap,

b. forming a plurality of self-breakable teats at the transverse line joining the letter sheet to the envelope sheet, the distance between the teats being at least ten times the width of said teats,

c. folding said letter sheet to lie within said envelope sheet,

d. folding the said envelope sheet around said folded letter sheet to enclose said letter sheet and form an envelope,

e. folding and closing said integral flap to form a folded and sealed mailing device,

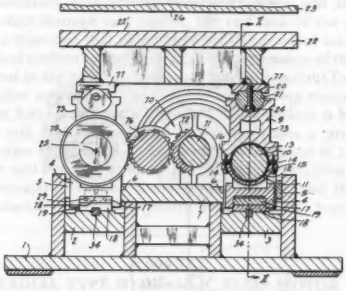
f. subsequent handling of said folded and sealed mailing device so as to result in separation of said letter sheet from said envelope, before said mailing device is opened.

3,998,139

DRIVE MECHANISM FOR A MOVABLE PLATEN

Edwin Bolliger, Morges, Switzerland, assignor to J. Bobst & Fils S.A., Switzerland

Filed Feb. 11, 1975, Ser. No. 548,978
Claims priority, application Switzerland, Feb. 12, 1974, 2024/74
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² B26D *5/14;* **B31B** *1/16*
U.S. Cl. 93—58.3 **10 Claims**



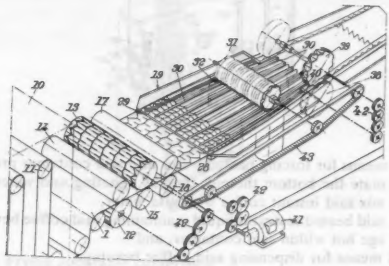
1. In a press having a frame, a fixed platen with a flat surface mounted on the frame, drive means disposed in the frame for reciprocating a movable platen having a flat surface in the frame relative to the fixed platen, said drive means including a main drive shaft having a gear, at least one crank shaft assembly disposed on each side of the main drive shaft, each crank shaft assembly having a bearing housing rotatably supporting an eccentric shaft having a gear and at least one connecting rod coupled to the movable platen, the gear of said drive shaft being in driving engagement with the gear of each assembly on one side and driving the gear of each assembly on the opposite side through an intermediate gear, said frame including means for mounting each of the bearings thereon, the improvement comprising each of the means for mounting including means for adjusting the distance of each bearing housing from the fixed platen both independently and simultaneously with the adjusting of the distance of the other bearing housings so that the orientation of the surface of the movable platen can be adjusted relative to the flat surface of the fixed platen and the force of impression of the press can be adjusted.

3,998,140

MACHINE FOR MANUFACTURING CORRUGATED STRUCTURES

Claude Maurice André, Elancourt, France, assignor to Sofited 2, Saint Ouen, France

Filed July 2, 1975, Ser. No. 592,656
Claims priority, application France, May 7, 1975, 75.14434
Int. Cl.² B65H 45/20
U.S. Cl. 93—84 R 15 Claims



1. A machine for manufacturing, out of a thin strip of filtering material, a flat and flexible folded structure that presents on each one of its two sides a series of parallel folded ribs showing ridges in a zigzagging pattern and corresponding to a series of cavities on the other side, and where each ridge of a rib is connected to each zigzagging line at the bottom of a contiguous cavity by a folded side consisting of a succession of facets in the shape of parallelograms, said machine including: two marking rollers with parallel axes, placed on either side of the direction of movement of the strip, respectively, and driven synchronously for the purpose of marking on the two sides of the strip impressions indicating the ridges of the ribs and the folds in the folded structure, where each roller presents a first and a second set of projecting marking lines corresponding, the first set, to the ridges of the ribs or to the bottom of the cavities, and the second set, to the folds in the sides of such ribs or cavities, respectively; means forming a guide passage limited laterally by two walls converging toward its exit; means to push the structure that is undergoing folding into the passage at a constant speed, characterized by the fact that the marking is such that the folded ribs run along the length of the strip and that the passage is fixed and enclosed vertically by two smooth walls, gradually diverging toward its exit in such manner that the transversal section of the entrance of the passage is practically complementary to the flattened rectangular section of the strip marked and not folded and that each section of the said passage by a vertical plane closely envelops the section of the structure that is being folded cut along the same plane, and the two diverging walls also present longitudinal smooth guiding ribs, the height of which increases toward the exit and which run along the median lines of the cavities enclosed between the folded ribs to be formed.

3,998,141

BATCH DELIVERY

Paul Yung Hsiue, Dayton, Ohio, assignor to Harris Corporation, Cleveland, Ohio

Filed June 19, 1975, Ser. No. 588,346
Int. Cl.² B31B 1/98
U.S. Cl. 93—93 M 31 Claims

1. Apparatus for batch delivery of a continuous stream of forms, comprising:

a. cycle control means for alternately placing the batch delivery apparatus in first and second modes,

b. a shingling conveyor,

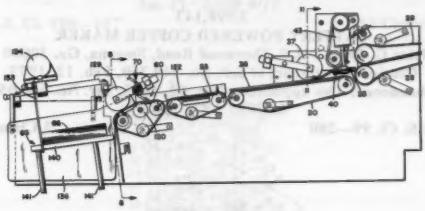
c. a shingling conveyor drive for driving said shingling conveyor,

d. spiral screw means coordinated with the stream of forms for receiving the stream of forms and depositing each form individually on said shingling conveyor to form a uniform shingle thereon,

e. a sweep conveyor located downstream from said shingling conveyor for receiving said shingle therefrom,

f. means incorporated in said sweep conveyor for diverting said sweep conveyor and the shingle thereon through a predetermined angle for separating the leading edge of each form from the shingled form therebeneath,

g. finger hook means operative when said batch delivery apparatus is in said second mode for engaging the separated leading edges of the forms on said sweep conveyor as they arrive at a predetermined location near said roller means, said finger hook means stopping movement of the engaged said forms on said sweep conveyor until said batch delivery apparatus is returned to said first mode, and



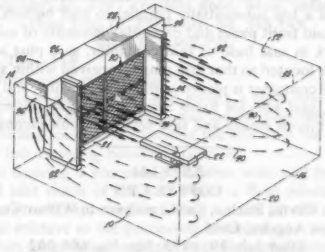
h. means for driving said sweep conveyor at at least a first speed during said first and second modes, and for driving said sweep conveyor momentarily faster at the start of said second mode to rapidly carry the forms thereon which are downstream from said predetermined location away from those forms stopped by said finger hook means.

3,998,142

AIR CIRCULATING SYSTEM FOR ULTRA CLEAN AREAS

Robert E. Foreman, and Casimir S. Strozewski, both of Santa Ana, Calif., assignors to Sterilaire Medical, Inc., Santa Ana, Calif.

Filed July 3, 1975, Ser. No. 593,023
Int. Cl.² B01D 46/00; F24F 9/00
U.S. Cl. 98—36 13 Claims



1. An air circulating system for providing an ultra clean air space sufficiently large to engulf a plurality of human beings in a room, comprising:

an upright blower and filter assembly, having a frontal air discharge face and means including final filters disposed adjacent said face for emitting a relatively low velocity laminar flow of ultra clean air approximately horizontally outwardly from said face;

a pair of upright air curtain plenums respectively disposed adjacent opposite side edges of said discharge face and in fluid communication with said assembly;

each air curtain plenum having a frontal approximately vertical air discharge slot therein and having air channeling means, independent of said final filters, for emitting adjacent the ultra clean air discharge face, a separate and approximately vertical air curtain of relatively high velocity air with approximate horizontal flow, said air channeling means being constructed to direct air at an acute angle inwardly toward the relatively low velocity ultra clean airflow from said ultra clean air discharge face; and

air return means coupled to said assembly.

3,998,143

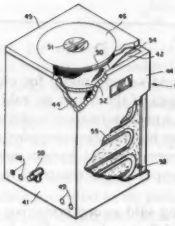
BATTERY POWERED COFFEE MAKER

Helen G. Frye, 741 S. Sherwood Road, Smyrna, Ga. 30080

Continuation-in-part of Ser. No. 549,350, Feb. 12, 1975, abandoned. This application Dec. 12, 1975, Ser. No. 640,051

Int. Cl.² A47J *31/00*

U.S. Cl. 99—280 **3 Claims**



1. A coffee maker comprising a container and an insulated housing for said container, said container including opposed walls, a top, and a base, a first heating element in one of said opposed walls, a second heating element in the other of said opposed walls, and a third heating element in said base, power supply means in said base, and selector means for selectively connecting said power supply means to said first heating element, said second heating element and said third heating element, said selector means including a first circuit means for connecting said first heating element, said second heating element and said third heating element in parallel with one another and with said power supply means, and second circuit means for connecting said third heating element in parallel with said power supply means and for isolating said first heating element and said second heating element, said housing including a front panel, a bottom, substantially parallel side walls, and a top substantially parallel to said bottom, a plug fixed to said front panel and extending inwardly of said housing, a jack in said base of said container, said plug and said jack being located so that said plug is received within said jack when said container is placed within said housing, and a selector knob, said selector knob being electrically connected to said first circuit means and said second circuit means.

3,998,144

COFFEE URN

Robert A. Curtis, Encino, Calif., assignor to Wilbur Curtis Co., Inc., Los Angeles, Calif.

Filed July 29, 1975, Ser. No. 600,002

Int. Cl.² A47J *31/00*

U.S. Cl. 99—293 **22 Claims**

1. A coffee urn for preparing instant coffee beverage comprising:

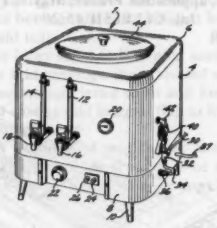
a. a housing having a continuous wall and a bottom,

b. a container for coffee beverage positioned substantially in said housing and spaced from said housing wall thereby defining a liquid reservoir between said housing wall and said container,

c. means for filling said reservoir with liquid,

d. means for heating said reservoir liquid,

e. lid means removable from said container to allow access to the interior of said container for depositing instant coffee at the bottom thereof,



f. means for forcing heated water into said container proximate the bottom thereof, thereby agitating said water to mix said instant coffee with said water,

g. said heated reservoir liquid maintaining said coffee beverage hot within said container, and

h. means for dispensing said coffee beverage.

3,998,145

COMBINATION GRILLING AND BAKING APPARATUS

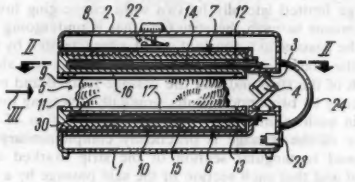
Emil Maisch, Grafenberg, Germany, assignor to Stumpp & Schule KG, Beuren, Germany

Filed Sept. 11, 1975, Ser. No. 612,294

Claims priority, application Germany, Sept. 11, 1974, 2443358

Int. Cl.² A47J *37/06*

U.S. Cl. 99—339 **4 Claims**



1. An apparatus for grilling and baking foodstuff, comprising:

A. a housing including a first and a second part, said parts being mutually movable;

B. contact members, associated with each of said first and second parts, each said contact member having interior voids and two differently patterned contact surfaces, each surface being suitably patterned to conform to a desired heating process, and wherein said apparatus further comprises a heating element associated with said first part and a heating element associated with said second part of said housing, said contact members receiving said heating element in said interior void when installed in said housing; and

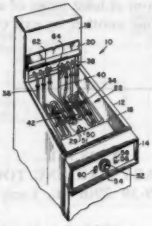
C. holding means, provided on said housing, for alignment and support of said contact members, said holding means further including guide rails which engage channels in said contact members and which permit sliding motion of said contact members in said housing.

3,998,146

FRYING APPARATUS WITH COMPENSATED THERMOSTAT

George M. Price, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.

Division of Ser. No. 465,918, May 1, 1974, Pat. No. 3,911,250.
This application Aug. 8, 1975, Ser. No. 602,966
Int. Cl.² A47J 37/12
U.S. Cl. 99—403 3 Claims



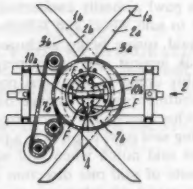
1. Frying apparatus comprising:
a free standing support housing,
a frypot mounted in the top of said support housing for containing cooking oil,
heating means in said frypot for heating said cooking oil,
thermostat means mounted on said housing separate from said heating means for sensing the temperature of said cooking oil and regulating said heating means to maintain a selected operating temperature of said oil, and
biasing heater means adjacent said thermostat means for heating said thermostat means to substantially simulate to said thermostat means the temperature of said cooking oil immediate to said heating means.

3,998,147

DEVICE FOR WIRE-BINDING BALES OF INCOHERENT MATERIAL, SUCH AS STRAW, HAY, ETC. AND FEEDING APPARATUS FOR SUCH A DEVICE

Giorgio Ceribelli, Via Privata Pienza, 18, Milan, Italy (20142)

Filed Nov. 12, 1974, Ser. No. 523,374
Claims priority, application Italy, Nov. 16, 1973, 31481/73; Sept. 4, 1974, 26922/74
Int. Cl.² B65B 13/28
U.S. Cl. 100—11 12 Claims



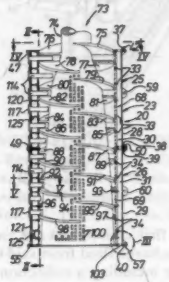
1. A device for binding materials together, comprising wire supply means for supplying a plurality of strands of binding wire, baling means for forming a bale from said materials by extending the strands of binding wire from a front end of a predetermined quantity of said materials to a back end of said materials in a spaced apart relationship around the outer surface of said materials, wire guiding means including two portions movable to and from each other in a plane transverse to said strands of wire, for engaging said wires at said back end and converging said wires at two points along their length, central core defining means associated with said wire guiding means for defining a central core substantially lying in said transverse plane and between said two points and rotating means for rotating said core to interlace said wires on both sides of said core.

3,998,148

PRESS FOR SUGAR BEET AND SIMILAR CHIPS

Helmut Mainka, Wolfenbuttel; Hans Schmidt, Heimerode, and Günther Grosshennig, Essen, all of Germany, assignors to Salzgitter Maschinen Aktiengesellschaft, Salzgitter, Germany

Filed Dec. 18, 1974, Ser. No. 534,351
Claims priority, application Germany, Dec. 22, 1973, 2364292
Int. Cl.² B30B 9/12
U.S. Cl. 100—117 12 Claims



1. In a press for sugar beet and similar chips, a combination comprising a pressing spindle rotatable about an upright axis; a housing surrounding said pressing spindle and having an upper section, a lower section and a middle section, said middle section including a self-supporting outer jacket and a tubular screen received with radial clearance in said outer jacket; means for mounting said screen on said outer jacket, including contacting portions embracing the outer surface of said screen, and means for securing said contacting portions to said outer jacket inwardly spaced therefrom; means for connecting said outer jacket with said upper and lower housing sections, respectively; and means for rotating said spindle about said upright axis and including a drive mounted on said upper section of said housing.

3,998,149

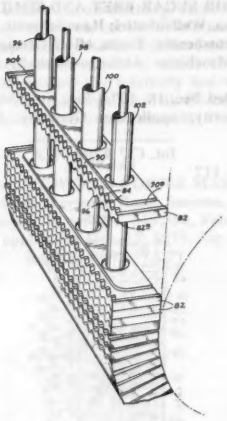
FILTER BELT AND PRESS

Neil Malarkey, Jr., 6307 Franklin Road, Boise, Idaho 83705

Filed Feb. 10, 1975, Ser. No. 548,749
Int. Cl.² B30B 9/02
U.S. Cl. 100—118 5 Claims

4. A filter press comprising
an elongate endless filter belt having a front filtering face and an opposite back face, and means mounting the belt including spaced rolls training the belt with the reach of the belt traveling between said rolls,
means forming a processing chamber with said front face and said reach of the belt where a fluid mixture to be filtered is compressed including an inlet for the supply of fluid mixture to the processing chamber,
said belt comprising multiple strip elements assembled to extend in a row extending the length of the belt, said strip elements extending transversely of said row, registering apertures in said strip elements extending through the elements, at least one elongate continuous strand extending through said apertures and constructed and arranged to flexibly support the strip elements, the strip elements further comprising first fluid channel means between adjacent elements recessed into at least one of said elements and extending the length thereof, escape passage

means between adjacent elements in fluid communication with the front face of the belt and providing a path for the flow of fluid from said front face to said first channel means, second fluid channel means located at each set of ends of adjacent elements in fluid communication with said first channel means and constructed and arranged to discharge fluid from said opposite back face, said press further including a collection chamber adjacent said back face of the belt for collecting fluid discharged from said back face.



3,998,150

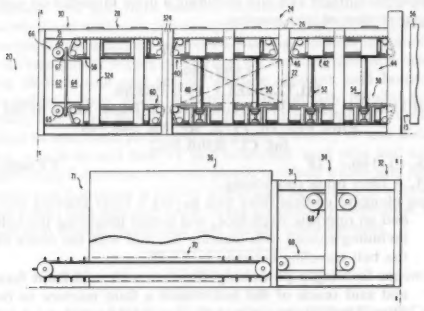
COTTON PACKAGING METHOD AND APPARATUS

George S. Buck, Jr., and Roger Russell, both of Memphis, Tenn., assignors to Cotton Incorporated, Raleigh, N.C.

Division of Ser. No. 532,008, Dec. 12, 1974, Pat. No. 3,948,021. This application Jan. 21, 1976, Ser. No. 650,982

Int. Cl.[2] B30B *1/32*

U.S. Cl. 100—269 R **16 Claims**



1. A cotton baling press comprising:

first and second superposed platen means including cotton compression surfaces, at least one of said platen means being movable toward and away from the other of said platen means;

compression control means operable to place said platen means in a position of adjacency and to compressively resist separation thereof, said compression control means comprising:

a plurality of piston and cylinders assemblies disposed in longitudinally spaced positions along each side of said one platen means in force transmitting relationship therewith;

fluid supply means,

conduit means for admitting fluid from said fluid supply means to the cylinders of said piston and cylinder assemblies and for transmitting fluid from said cylinders in response to separation of said platen means; and

pressure control valve means for limiting flow of fluid from said cylinders to flow at a predetermined pressure,

the outlet flow from at least some of said cylinders being isolated from one another by exit check valve means.

3,998,151

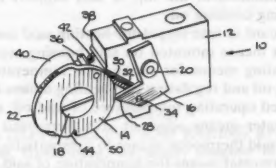
ROTARY MARKING TOOL

Jerome Friedman, 39-39 29th St., Long Island City, N.Y. 11101

Filed June 4, 1975, Ser. No. 583,775

Int. Cl.[2] B44B *5/02*

U.S. Cl. 101—6 **2 Claims**



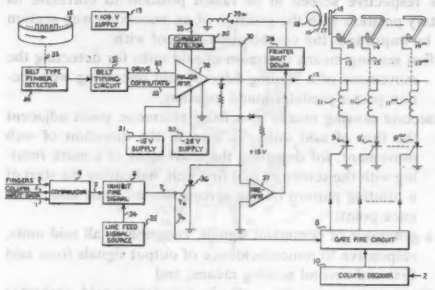
1. A rotary marking tool comprising a block, a marking wheel rotatably connected to one side of said block, said wheel including on the periphery thereof raised characters for marking a workpiece, a stop-pin affixed to and eccentrically of the axis of rotation of said wheel, said block including an arcuate frontal portion along and over which said stop-pin traverses in spaced relation during rotation of said wheel, said block further including abutment means adjacent to said arcuate frontal portion for being engaged by said stop-pin in one direction of the rotation of said wheel, an elongate slot formed in said side of said block and terminating with an open end at said arcuate frontal portion, a tension spring disposed in said slot and terminating in one end which is anchored to said stop-pin, a pawl pivotally connected to said side of said block adjacent to said wheel and terminating in a beak, the other end of said spring being anchored to said pawl and urging said beak against said wheel perphery whereby said wheel is rotatably urged to an at-rest position at which said stop-pin and abutment means engage one another, a notch formed in said wheel periphery remote from said stop-pin, said spring also urging said pawl to pivot to a position at which said beak penetrates said notch when said wheel is rotated in a direction opposite of said one direction and away from said at-rest position, said beak when penetrating said notch preventing further rotation of said wheel away from said at-rest position, said arcuate frontal portion of said block presenting an entirely rounded stationary surface against which said spring slides during expansion and contraction and, thereby, preventing the latter from snagging and being stretched beyond its elastic limit, said arcuate frontal portion including a first surface section of rounded cross-section, and a second surface section of rounded cross-section but having a smaller radius or curvature than said first surface section, said second surface section being more proximate to said at-rest position of said wheel and constituting the initial snag-proof surface of said arcuate frontal portion to be contacted by said spring when said wheel is rotated away from said at-rest position.

3,998,152

PROTECTION SYSTEM FOR HAMMER DRIVE CIRCUITS IN IMPACT PRINTERS

Arthur C. Hupp, Lyndhurst, Va., assignor to General Electric Company, Waynesboro, Va.

Filed Mar. 26, 1975, Ser. No. 562,105
Int. Cl.² B41J 9/38
U.S. Cl. 101—93.29 8 Claims



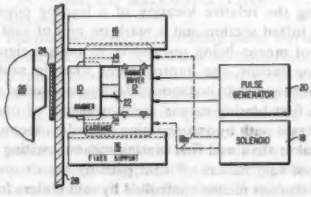
1. In a printer for printing characters corresponding to input signals wherein a plurality of type fingers are carried by an endless belt along a line of columns on a record medium and the column position of individual ones of said fingers is defined by finger signals, a plurality of print hammers each one positioned in front of a different one of said columns and operable for impacting type fingers passing before it, a plurality of hammer operating circuits each comprising a winding which is operatively associated with a respective one of said hammers, a logic circuit for selecting desired ones of said print hammers, said logic circuit comprising means responsive to input signals and said finger signals for preconditioning selected ones of said hammer operating circuits for operation when type fingers on said carrier specified by said input signals are positioned at the proper columns for printing, said last named means comprising means for preconditioning said hammer operating circuits in non-overlapping time periods during a signal compare period, means for simultaneously energizing all of said windings during a drive period following said signal compare period to cause only those hammer operating circuits which have been preconditioned during the previous signal compare period to conduct current sufficiently to cause their windings to operate their associated hammers and effect printing, and means responsive to current flow in any winding during a drive period in the absence of any preconditioned windings to block printing.

3,998,153

HIGH FREQUENCY POWER INTEGRATING PRINTER

Heinrich S. Erhardt, Warminster, and Mosi Chu, Hatfield, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 18, 1975, Ser. No. 559,572
Int. Cl.² B41J 9/02
U.S. Cl. 101—93.48 3 Claims



1. In a printer mechanism of the type having a hammer that is actuated to impact a paper and inking substrate between a print member and said hammer, the improvement comprising:

a stationary support;

a hammer carriage mounted on and supported by said stationary support and moveable between a first position and a second position on said stationary support,

said hammer being mounted on said carriage and moveable relative thereto;

means linked to said carriage for moving said carriage between said first position whereat said hammer cannot impact said paper when moved relative to said carriage and said second position whereat said hammer impacts said paper and inking substrate between said hammer and said print member each time said hammer is impulsed; and,

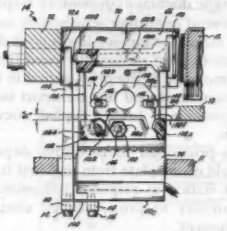
hammer impulsing means separate from said means for moving said carriage, said hammer impulsing means mounted on said carriage and being linked to said hammer for repetitively impulsing said hammer each time said carrige is at said second position.

3,998,154

HAMMER ASSEMBLY FOR USE IN IMPACT PRINTERS

Kenneth G. Real, Redmond; Larry P. Ellefson, Seattle, and Robert J. Brooks, Bellevue, all of Wash., assignors to Interface Mechanisms, Inc., Mountlake Terrace, Wash.

Filed Nov. 13, 1975, Ser. No. 631,742
Int. Cl.² B41J 9/02
U.S. Cl. 101—93.48 10 Claims



1. A hammer assembly for use in an impact printer including a print station comprising hammer assembly support means and hammer actuating means having a controllable, substantially reciprocative movement, said hammer assembly comprising:

a. an elongated hammer means having a hammer surface located at one end thereof and an actuating surface located at the other end thereof suitable for engaging the hammer actuating means,

b. an elongated first support member having first and second ends,

c. first and second linear leaf springs having their ends rigidly secured to said elongated hammer means and to said first support member at corresponding ends thereof and supporting said elongated hammer for substantially reciprocative, planar movement with respect to said first support member,

d. a second support member capable of being rigidly secured to the hammer assembly support means,

e. flexure means connecting said second support member to said first support member at a location thereon offset from but adjacent to said first end, and

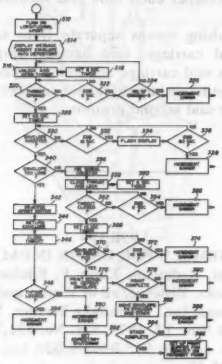
f. adjusting means coupled to said first support member for permitting adjustable rotation of said first support member, and accordingly said elongated hammer means, with respect to said second support member through said flexure means.

3,998,155

DEPOSITORY SYSTEM

Martin D. Cothran, Euless; Lewis J. O'Kelly, Fort Worth, both of Tex., and Russell L. Hall, Scottsdale, Ariz., assignors to Docutel Corporation, Dallas, Tex.

Division of Ser. No. 320,718, Jan. 3, 1973, Pat. No. 3,873,443.
This application May 30, 1974, Ser. No. 474,526
Int. Cl.² B41J 1/32
U.S. Cl. 101—110 9 Claims



1. In an automatic document depository responsive to commands from a central controller, comprising in combination:

first transport means for moving the deposit document from an entry gate to print station displaced therefrom,

a divert plate mounted at the print station in the path of the moving document on said first transport means and movable into a position to guide a deposit document into the print station,

printer means positioned to receive a deposit document guided by said divert plate from said first transport means at the print station in response to commands from the central controller to print selected characters on the deposit document,

first sensor means responsive to the positioning of the deposit document at the print station to generate a signal to the central controller, the controller actuating said printer means to imprint the selected characters on the positioned document,

second sensor means responsive to the actuation of said printer means to generate a print check signal to the central controller as an indication of the actuation of said printer means,

stacker means receiving a deposit document from the print station for storage thereof, and

second transport means positioned transverse to said first transport means and including at least one sweeper extending into the print station to remove a document from said transport means for delivery to said stacker means.

3,998,156

ROTARY SCREEN REGISTRATION SYSTEM

Peter Zimmer, Untere Sparchen 54, A 6330 Kufstein, Austria

Filed Sept. 10, 1973, Ser. No. 395,554
Claims priority, application Austria, Sept. 8, 1972, 7763/72
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² B41F 15/10, 5/16
U.S. Cl. 101—115 9 Claims

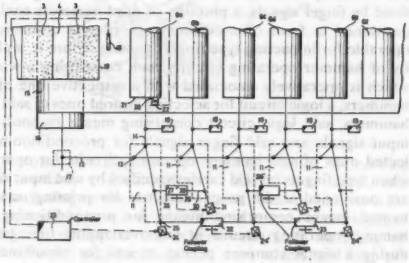
1. In a machine for printing a recurrent pattern on consecutive sections of predetermined length of a textile web, comprising a plurality of parallel printing units with rotary screens overlying the path of the web, common drive means for rotating said screens, transport means for advancing said web at a speed corresponding to the peripheral velocity of said screens, individual lifting means for raising each screen above said path during an inoperative period of the respective units in a predetermined sequence depending upon the advance of said web, and control means in each of said units for angularly adjusting the respective screen in its raised position to correlate its rotary position with the position of an oncoming web section to be imprinted, the combination thereof with:

first sensing means upstream of said units for detecting the movement of a leading edge of said oncoming web section past a predetermined location;

second sensing means at a fixed reference point adjacent the first of said units, as seen in the direction of web movement, for detecting the movement of a mark rotating with the screen of said first unit, indicating the start of a printing pattern on the screen thereof, past said reference point;

a generator of command signals, common to all said units, responsive to noncoincidence of output signals from said first and second sensing means; and

transmission means operatively connecting said generator



to said units for sequentially delivering said command signals to said control means of said units for angularly adjusting the screens thereof at times when said screens are in their raised position.

9. In a machine for printing a recurrent pattern on consecutive pile sections of predetermined length carried on a web of textile fabric, comprising a plurality of parallel printing units with rotary screens overlying the path of the web, drive means for rotating said screens, transport means for advancing said web at a speed corresponding to the peripheral velocity of said screens, control means for angularly adjusting said screens to correlate their rotary positions with the position of an oncoming tufted section to be imprinted, and sensing means for determining the relative location of a leading edge of said oncoming tufted section and a mark on one of said screens, said control means being responsive to output signals from said sensing means, the improvement wherein said sensing means comprises two juxtaposed feelers normally overlying said path, first biasing means resisting lifting of one of said feelers off said path by an oncoming pile edge, second biasing means weaker than said first biasing means resisting lifting of the other of said feelers off said path by the oncoming pile edge, and contact means controlled by said feelers for closing a signaling circuit in a nonelevated position of said one of said feelers and in a lifted position of said other of said feelers.

3,998,157

PIVOTAL SQUEEGEE MOUNT WITH FLUID BIAS

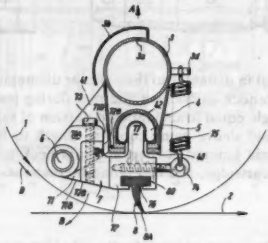
Mathias Mitter, Verl-Sende-Mitte, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed June 19, 1974, Ser. No. 479,939

Claims priority, application Germany, June 20, 1973, 2331322

Int. Cl.² B41F 15/08, 15/44

U.S. Cl. 101—120 19 Claims



1. In a screen printing machine, the combination of an elongated tubular liquid-permeable stencil having endless internal and external surfaces; means for moving said stencil in a predetermined direction relative to a moving web of material to be printed so that successive increments of said external surface contact successive increments of the web; stationary support means having portions located in the interior of said stencil for supporting a holder; a squeegee adjacent to and in contact with said internal surface along a line of contact; a holder for holding said squeegee and being pivotably supported on said portions of said support means so that said holder can turn about a pivot axis which extends transverse to the direction of movement of said stencil and is located ahead of said squeegee, as considered in said direction of movement; first biasing means for biasing said holder, said first biasing means being located above said holder upwardly of the line of contact between said squeegee and said internal surface, so as to urge said squeegee in vertical direction against said internal surface; and second biasing means engaging said holder and acting upon the same in opposition to said first-mentioned biasing means.

3,998,158

FRICTION AND VIBRATION REDUCING MEANS FOR THIN BLADE SQUEEGEE

Jacobus Gerardus Vertegaal, Boxmeer, Netherlands, assignor to Stork-Brabant B.V., Boxmeer, Netherlands

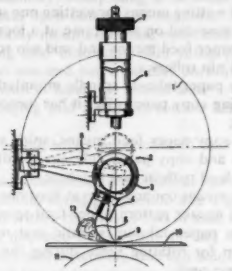
Filed Oct. 2, 1974, Ser. No. 511,201

Claims priority, application Netherlands, Oct. 2, 1973, 7313509

Int. Cl.² B41F 15/42, 15/44

U.S. Cl. 101—120 3 Claims

1. An internal squeegee for pressing paste through a cylindrical thin walled stencil of a rotary screen printing machine and comprising a mounting, a thin resilient metal strip secured in said mounting with a portion thereof freely protruding from said mounting and said protruding portion having a free edge, said strip having a thickness less than 1 percent and greater than 0.1 percent of the width of said freely protruding portion of the strip, the protruding portion of said strip being deflected when in operation such that the face of said strip directed toward said inner wall of the stencil and in contact with the paste is convex, and a covering layer consisting of a synthetic material having a low friction when in the non-dry condition along the free edge of said convex face of said strip to reduce



friction exerted on the squeegee by the rotating stencil thereby eliminating vibration of the metal strip.

3,998,159

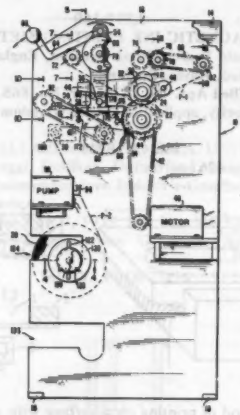
PATTERN COPYING MACHINE

Oscar Lande, Staten Island, N.Y., assignor to Image Duplicating Systems Inc., Jamaica, N.Y.

Filed Sept. 20, 1974, Ser. No. 507,668

Int. Cl.² B41L 11/12

U.S. Cl. 101—131 6 Claims



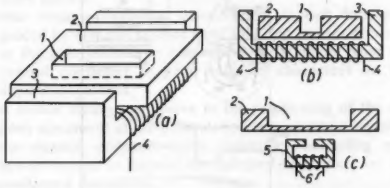
1. A garment pattern copying machine comprising:
1. a frame;
2. a pair of rubber-covered nip rollers mounted on said frame for rotational movement;
3. means mounting at least one of said nip rollers for movement toward and away from the other nip roller;
4. a single control arm for controlling the operation of said machine, said control arm being movable relative to said frame to a print position, a neutral position and a rewind position;
5. nip roller control means connected between said control arm and said at least one movable nip roller for causing relative movement of said nip rollers to come together when said control arm is moved into said print position and to separate when said control arm is moved into said neutral and rewind positions;
6. a master pattern paper feed spindle and a master pattern paper take-up spindle mounted on said frame and defining, with said nip rollers, a master pattern paper feed path;

7. copy paper feed means mounted on said frame including a copy paper feed spindle for mounting a supply of copy paper;
8. a spirit wetting means for wetting one surface of said copy paper mounted on said frame at a location between said copy paper feed means and said nip rollers and adjacent to said nip rollers;
9. a copy paper take-up spindle mounted on said frame for receiving copy paper after it has passed through said nip rollers;
10. said copy paper feed means, spirit wetting means, nip rollers and copy paper take-up spindle defining a copy paper feed path in said machine;
11. drive means connected to at least one of said nip rollers, to said master pattern paper feed spindle, to said master pattern paper take-up spindle and to said copy paper take-up for rotating same during the operation of said machine; and
12. drive control means including electromechanical switch means interconnecting said control arm and said drive means for (a) energizing said drive means and driving said master pattern paper take-up spindle, said copy paper take-up spindle and said nip rollers only in response to movement of said single control arm into said print position and when said nip rollers are moved together and for (b) energizing said drive means and driving said master pattern paper rewind spindle only in response to movement of said single control arm into said rewind position and when said nip rollers are separated.

3,998,160
MAGNETIC INK PRINTING METHOD

Ralph Reginald Pearce, West Drayton, England, assignor to EMI Limited, Hayes, England

Filed Apr. 16, 1975, Ser. No. 568,530
Claims priority, application United Kingdom, Apr. 17, 1974, 16699/74
Int. Cl.² B41F *9/00*
U.S. Cl. 101—426 **13 Claims**



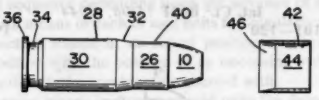
1. A method of printing on a surface with an ink including acicular magnetic particles so that the authenticity of the printing can be verified, wherein a pattern is formed on a carrier with the ink in the wet state, the particles are subjected to a magnetic aligning process while mobile in the ink on the carrier, the wet ink is transferred to said surface and dried to immobilise the particles in their alignment, the transfer thus being effected with the particles already substantially aligned.

3,998,161
CARTRIDGE ADAPTER

Robert C. Booth, 22957 Sutro St., Hayward, Calif. 94541

Filed June 30, 1975, Ser. No. 591,836
Int. Cl.² F42B *5/26*
U.S. Cl. 102—43 R **1 Claim**

1. In conjunction with a bottleneck cartridge having a major cylindrical portion, a tapered portion extending forward from said major cylindrical portion, a cylindrical neck portion extending forward from said tapered portion, and a projectile secured in the forward end of said neck portion, a device for adapting said bottleneck cartridge for use in a firearm requiring a smooth cylindrical cartridge, said device comprising a cylindrical sleeve adapted to be secured about said bottleneck cartridge, said sleeve having an outer diameter equal to the outer diameter of said major cylindrical portion of said bottleneck cartridge, said sleeve including a bore having a forward

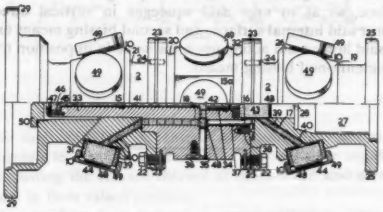


portion equal in diameter to the exterior diameter of said neck of said bottleneck cartridge and a rear flaring portion extending at an angle equal to said tapered portion of said bottleneck cartridge; said sleeve being equal in length to the combined lengths of said tapered portion and said neck portion of said bottleneck cartridge, and extending thereabout.

3,998,162
MISSILE WARHEADS

Thomas Percy Forrest, Chelsfield; William Ernest Soper, West Wickham, and Donald McKenzie, Hartley, Dartford, all of England, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 16, 1958, Ser. No. 761,442
Claims priority, application United Kingdom, Sept. 17, 1957, 29324/57
Int. Cl.² F42B *13/10*
U.S. Cl. 102—56 SC **3 Claims**



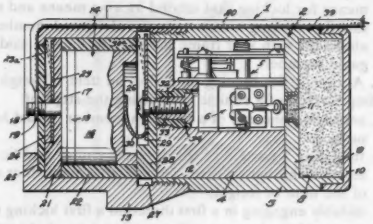
1. A missile warhead having a plurality of lined shaped charges symmetrically disposed about the missile axis and arranged in three banks, a forward bank the charges in which are directed diagonally forward; a central bank the charges in which are directed radially and a rearward bank the charges in which are directed diagonally rearward with respect to the missile axis; a central metal block to which the charges are attached and within which in a system of branching channels which channels comprise an axial channel extending into the block from an initiation point at its forward end, diagonal channels extending from the rearward end of the axial channel one to each charge in the central and rearward banks and channels extending from an intermediate point of the axial channel first radially outward, then longitudinally forward and finally diagonally forward, one to each charge in the forward bank, the distances along the channels from the initiation point to the charges being equal; a filling of tetryl pellets within the longitudinal and radial parts of the channels; a thin metal tube within each diagonal channel and a filling of an explosive composition within each thin metal tube.

3,998,163

LUCKY-IN-BASE FUZE ASSEMBLY

James Gary Nelson, 427 Bernice Terrace, Aberdeen, Md. 21001

Filed Feb. 6, 1962, Ser. No. 171,537
Int. Cl.² F42C 11/02
U.S. Cl. 102—70.2 GA 4 Claims



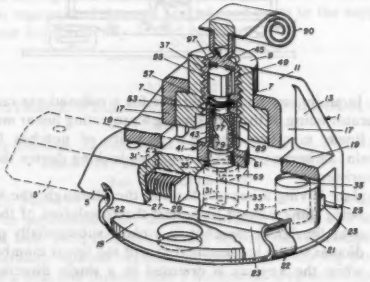
1. A fuze assembly for attachment to a projectile including a casing, a booster charge and a means for firing said booster charge in said casing; an acceleration energized electric energy source for said firing means comprising, an inertia mass slidably mounted in said casing, a first electrical terminal supported rearwardly in said casing, a piezoelectric element mounted between and in contact with said first terminal and said inertia mass, a second electrical terminal for contact with said firing means, said second terminal being secured forwardly in said casing; and a means for building up an electrical charge across said piezoelectric element comprising, a first resilient contact secured on said first terminal and being normally out of contact with said casing and a second resilient contact secured on said second terminal, said second resilient contact being in constant contact with said inertia mass, and being normally out of contact with said casing said inertia mass moving rearwardly upon projectile acceleration to energize said piezoelectric element and whereby said first and second resilient contacts upon maximum projectile acceleration contact said casing thereby shorting out said electrical charge built up across said piezoelectric element to said casing, said first and second resilient contacts resuming out-of-contact positions with respect to said casing upon reduced projectile acceleration.

3,998,164

SELF-DESTRUCT DELAY FUZE

Harry J. Hadfield, Califon, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 15, 1975, Ser. No. 640,615
Int. Cl.² F42C 15/04
U.S. Cl. 102—81.2 7 Claims



1. A self-destruct delay fuze comprising:

a generally tubular firing pin support open at one end and closed at the other end;

a detonator assembly, comprising a detonator, mounted adjacent to said open end of said support;

a firing pin slidably mounted in said open end of said support for firing said detonator, said firing pin having a firing point at one end and a tubular portion a the other end formed with at least one helical slot;

spring means urging said firing pin toward said detonator assembly;

means for preventing rotary movement of said firing pin in said support;

a timing member comprising a cylindrical shaft telescoped within said tubular firing pin portion and a paddle rotatably mounted within the closed end of said support;

a camming pin disposed transversely in said shaft of said timing member and extending through said helical slot, for converting the sliding motion of said firing pin to rotary motion of said timing member;

means for limiting longitudinal movement of said timing member in said support; and

a ring seal disposed between sid shaft and said support adjacent to said paddle, to form a fluid-tight chamber between said paddle and said support;

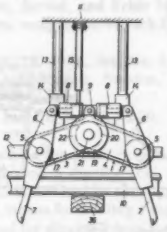
said chamber being filled with a highly viscous fluid, to retard the rotary motion of said paddle in said support.

3,998,165

BALLAST TAMPING TOOL UNIT

Hans Peter Jaeggi, Dulliken, Switzerland, assignor to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria

Filed Apr. 7, 1975, Ser. No. 565,339
Claims priority, application Germany, Apr. 8, 1974, 2417062
Int. Cl.² E01B 27/16
U.S. Cl. 104—12 6 Claims



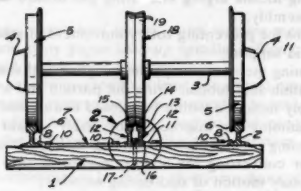
1. A tamping tool unit for a ballast tamping machine, comprising

1. a pair of tamping tool holders;
2. drive means for pivoting the tamping tool holders towards and away from each other;
3. an axle pivotally supporting each tamping tool holder;
4. an eccentric bearing bushing rotatably mounted on the axle; and
5. further drive means for rotating the bearing bushing whereby a compound motion consisting of a vertical and a horizontal component is imparted to each tamping tool holder.

3,998,166
MULTI-RAIL SYSTEM AND METHOD OF INSTALLATION

Morrison Morrison, 2700 Neilson Way Apt. 628, Santa Monica, Calif. 90405

Filed May 19, 1975, Ser. No. 578,630
Int. Cl.² E01B 12/02
U.S. Cl. 104—243 17 Claims

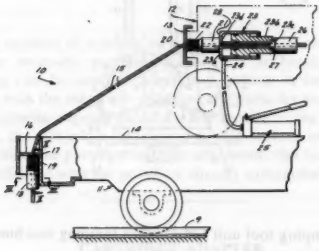


1. A railroad system utilizing a standard railroad used by standard railroad cars having standard wheels the railroad having a paired series of standard railroad rails connected by standard ties, said railroad system comprising:
   a. a series of load bearing supplementary railroad rails;
   b. a series of supplementary tie webs extending between and secured to the pairs of railroad rails, said tie webs having means for receiving the supplementary railroad rails in predetermined fixed relation between the pairs of standard railroad rails;
   c. supplementary load bearing wheels mounted on the railroad cars and positioned for engagement with the series of supplementary railroad rails to provide support for the railroad cars supplementing the load carried by the standard wheels;
   d. and means for raising and lowering the supplementary wheels with respect to the standard wheels to permit the railroad cars to run on standard tracks and over standard switches.

3,998,167
METHOD AND APPARATUS FOR BRACING FREIGHT

James J. Van Gompel, Fremont, Ind., assignor to Brammall, Incorporated, Angola, Ind.

Filed Mar. 17, 1976, Ser. No. 667,593
Int. Cl.² B65J 1/22
U.S. Cl. 105—477 8 Claims



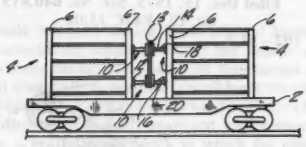
1. An apparatus adapted for bracing items of freight comprising in combination:
   a. a freight carrying vehicle having a loading platform;
   b. an item of freight on said platform having a frame member with an opening;
   c. an anchoring means on said loading platform;
   d. an elongated member having one end connected to said anchoring means, the other end being received through said frame member opening;
   e. first locking means connected to said other end of the elongated member for slidably engaging said elongated member in one direction and locking to said elongated member in an opposite direction;
   f. second locking means connected to said other end of the elongated member for slidably engaging said elongated member in said one direction and locking to said elongated member in said opposite direction; and
   g. expansion means between said first and second locking means for locking said second locking means and sliding said first locking means over said elongated member into abutment with said frame member to tension said elongated member.

7. A method for bracing an end of an item of freight on a loading surface of a vehicle comprising the steps of:
   a. anchoring one end of a tie-down member to said loading surface;
   b. threading a portion of the opposite end of said tie-down member through an opening in a frame member at an end of the item of freight;
   c. slidably engaging in a first direction a first locking means over said tie-down member portion into abutment with said frame member, said first locking means locking to said tie-down member when moved in an opposite direction;
   d. positioning an expansion means against said first locking means;
   e. slidably engaging in said first direction a second locking means over said tie-down member portion into abutment with said expansion means, said second locking means locking to said tie-down member when moved in said opposite direction; and
   f. expanding said expansion means to slide said first locking means and lock said second locking means to tighten said tie-down member.

3,998,168
IMPACT PANEL SEPARATOR LOCKING DEVICE

Paul J. Rakoczy, 28810 Village Lane, Farmington Hills, Mich. 48024

Filed June 6, 1975, Ser. No. 584,279
Int. Cl.² B60P 7/14, 7/16; B61D 45/00, 49/00
U.S. Cl. 105—490 9 Claims



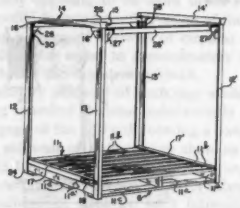
1. In an impact panel separator for a railroad car rack, the separator being of the type having a projecting linear member, the linear member having a plurality of notches formed therein, an improved notch engaging locking device therefor, comprising:
   a plate having a keyway formed therethrough, the keyway being dimensioned to permit the translation of the plate over the linear member in a plane substantially perpendicular to the longitudinal axis of the linear member only when the keyway is oriented in a single direction, the direction being achieved by the rotation of the plate in the plane.

3,998,169

KNOCK-DOWN PALLET STACKER

Robert B. Koch, Chagrin Falls, Ohio, assignor to Bliss & Laughlin Ind., Inc., Cleveland, Ohio

Filed Sept. 4, 1975, Ser. No. 610,118
Int. Cl.² B65D *19/40*
U.S. Cl. 108—53.5 5 Claims



1. A demountable metal stacking device adaptable for use with a standard rectangular wood pallet consisting of a plurality of parallel stringers of uniform depth, two of which are close to marginal edges of said pallet and rigidly connected by boards secured to the upper and lower surfaces of said stringers; said device comprising four parallel vertical corner posts, one at each corner of said rectangle; two lower cross pieces secured one between each two posts respectively on opposite sides of said rectangle at a height to rest approximately on said boards on the upper surfaces of said stringer and holding the associated posts firmly against opposite ends of said stringer; a bottom plate rigidly secured to each of said posts in position to fit between said boards on the lower surfaces of said stringers and a supporting floor; said plates having an area at least covering the major portion of the sectional area of each post; a tab rigidly secured near the bottom of each post spaced to rest firmly against the inner vertical face of each marginal between said boards on said upper and lower stringer surfaces; four upper cross pieces secured by connections between the upper ends of said posts along the four sides of said rectangle; two of said connections being demountable pins; on end of each of said lower cross pieces being secured by a permanently attached extendable and collapsible connection to an associated post which is extendable to permit said bottom plate and tab to pass over said marginal stringer and is collapsible to hold said corner post and connected lower cross pieces closely assembled; the opposite end of each lower cross piece being welded to its associated post; and upwardly extending guide means flared outwardly and rigidly secured to some of said upper cross pieces and positioned to guide an upper device relative to a lower device when two of said devices are stacked so that each of said posts of an upper device rests vertically above a respective post of said lower device; whereby said posts and said bottom plates and said tabs and said lower cross pieces provide protection of said wood pallets against damage and the load from each pallet above the lowermost is transmitted through said aligned posts to the supporting floor independently of said pallets.

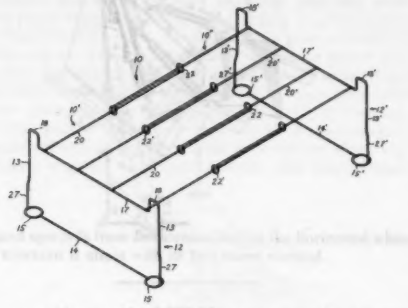
3,998,170

ADJUSTABLE WIRE SHELF FOR FROZEN FOODS, AND THE LIKE

Harvey Gordon, 32 Paerdegat 12th St., Brooklyn, N.Y. 11236

Filed Nov. 24, 1975, Ser. No. 634,853
Int. Cl.² A47B *7/00*
U.S. Cl. 108—91 4 Claims

1. An adjustable wire shelf comprising a first half and a second half, each of said first and second halves comprising two parallely spaced vertical leg portions, each leg portion having a first end formed into a horizontal loop and a second end spaced from said first end, a bottom horizontal portion connecting the horizontal loops of said vertical leg portions, a top horizontal portion having a first hump near said second end of one of said vertical leg portions and a second hump spaced from said first hump near said second end of the other of said vertical leg portions, and a plurality of parallely spaced horizontal legs extending perpendicularly from said top horizontal portion, each horizontal leg having a first end connected to said top horizontal portion and a second end spaced from said first end of said leg in a direction perpendicular to the plane containing said vertical leg portions, said second end



of said leg having a loop formed thereon extending in a vertical direction, said vertical loops of one of said halves completely surrounding a corresponding one of said horizontal legs of the other of said halves, said shelf defining a shelf space for the reception of frozen goods and the like, each of said vertical leg portions comprising a bent portion, said bent portion being formed in order to allow for the formation of said horizontal loop, whereby the two halves are adjustably positionable relative to each other and together form a shelf that may be shortened or lengthened.

3,998,171

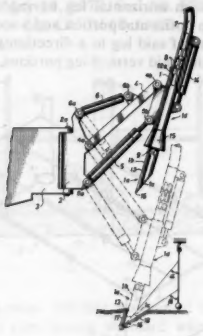
DEPTH-INDICATING PLANTING MACHINE

Stig-Gunnar Löfgren, Jarved, and Fride Moberg, Ornskoldsvik, both of Sweden, assignors to Mo och Domsjo, Ornskoldsvik, Sweden

Filed Nov. 22, 1974, Ser. No. 526,278
Claims priority, application Sweden, Nov. 29, 1973, 7316167
Int. Cl.² A01C *11/00*
U.S. Cl. 111—2 10 Claims

1. A planting machine for planting plants, having a pneumatic depth indicator on a digging tool indicating when a predetermined depth is reached by the digging tool, comprising, in combination, means for holding a supply of plants to be planted; a digging tool for digging a hole for a plant; means for conveying a plant from the supply to the holes; a vehicle carrying the digging tool, the conveying means, and the plant supply; and a depth indicator in operative association with the digging tool and which gives a signal when the digging tool has reached a predetermined depth for a plant to be transferred by the conveying means to the hole, the depth indicator comprising at least one gas conduit for conveying a gas under superatmospheric pressure from one end to the other end thereof, the one end being adapted to be connected to a gas supply, and the other end being open to the atmosphere and spaced a vertically projected distance from the tip of the digging tool equal to the depth of the hole dug by the tool for a plant, the other end being so arranged that the opening to atmosphere is plunged into blocking contact with the earth when the prede-

termined hole depth is reached, thereby halting flow of gas from the conduit, resulting in an increase in gas pressure in the



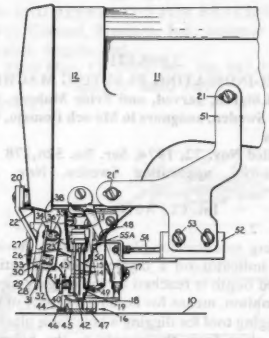
conduit; and means responsive to such increase in gas pressure and giving a signal.

3,998,172

THREAD CUTTER DEVICE FOR SEWING MACHINES

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Aug. 4, 1975, Ser. No. 601,526
Claims priority, application Italy, Aug. 7, 1974, 26072/74
Int. Cl.² D05B *65/00*
U.S. Cl. 112—252 **5 Claims**



1. A thread-cutter device for the cover thread of a sewing machine comprising:

a. a presser bar slidably mounted in the head of the sewing machine;

b. a presser foot attached to said presser bar;

c. clamping means connected to said presser bar for operative association with said presser foot;

d. means defining a thread cutter attached to and movable with said presser bar; and

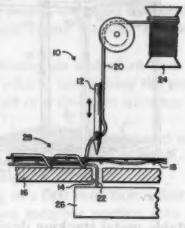
e. a cover thread positioning member pivoted on the head of the sewing machine and selectively movable for moving the cover thread to a position of engagement by said clamping means and for cutting by said thread cutter.

3,998,173

STITCHED WIRE ELECTRICAL STRUCTURE AND METHOD OF MAKING SAME

Clyde E. Williamson, Torrance, and Irvin G. Aker, El Segundo, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Dec. 9, 1974, Ser. No. 530,909
Int. Cl.² D05B *1/00*; H01Q *1/36*
U.S. Cl. 112—262 **13 Claims**



1. The method of fabricating an electrical antenna grid screen structure comprising the steps of:

stitching a substrate along intersecting rows by feeding a wire against one side of the substrate and stitching a thread through the substrate and around the wire to form a lockstitch therewith to produce on the substrate a wire grid comprising crossing wires; and

electrically joining said wire at their intersections to form an electrically conductive screen.

3,998,174

LIGHT-WEIGHT, HIGH-STRENGTH, DRAWN AND IRONED, FLAT ROLLED STEEL CONTAINER BODY METHOD OF MANUFACTURE

William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Aug. 7, 1975, Ser. No. 602,727
Int. Cl.² B21D *51/10, 22/30*
U.S. Cl. 113—120 H **3 Claims**

1. Method of manufacturing a sheet metal can body of high tensile strength flat rolled steel container plate which has been double reduced by cold rolling without an intermediate anneal to a thickness gage of about 0.008 inch to about 0.011 inch comprising the steps of

providing a flat rolled steel sheet metal blank of high tensile strength steel having a thickness gage of about 0.008 inch to about 0.011 inch, such flat rolled steel being characterized by tensile strength of about 80,000 to 120,000 psi,

drawing the sheet metal blank into a cup having an endwall and unitary sidewall defining an open end longitudinally opposite to the endwall such that the unitary sidewall is substantially uniformly spaced from a longitudinal axis centrally disposed of the cup being drawn with the drawing of the sheet metal blank into such up-shaped configu-

ration taking place without substantially changing the gage of the flat rolled steel, and the endwall of such cup having a substantially planar configuration and being disposed in substantially right angled relationship to such central longitudinal axis,

providing an ironing mandrel having a sidewall uniformly spaced from its central longitudinal axis and a bottomwall profile-forming configuration at its working end longitudinally opposite to its work input end, such bottomwall profile-forming configuration of the ironing mandrel having a recessed endwall of circular configuration having a diameter equal to approximately 85 percent of the diameter of the mandrel sidewall,

ironing the unitary sidewall of such cup while mounted on the ironing mandrel without substantially changing the thickness gage of the endwall forming a can body with an elongated sidewall of lighter gage than its bottom wall, and forcing the interior surface of such unitary sidewall into intimate contact with the mandrel sidewall and causing tight adherence between such intimately contacted surfaces,

forming a bottom wall profile in the can body while the can body is mounted on the ironing mandrel to provide a circular configuration recessed panel having a diameter of approximately 85 percent of the diameter of the unitary sidewall, the recessed panel having a convex configuration as viewed from the exterior of the can body, and an annular chime portion joining the recessed panel to the sidewall, the annular chime having a U-shaped configuration in radial cross-section with a rounded bottom configuration and an interior leg of substantially cylindrical configuration, the interior leg of the bottom wall profile being disposed substantially parallel to the unitary sidewall of the can body, with the recessed panel being formed by a male die member contacting bottom sheet metal of the can body about the full periphery of the reduced diameter circular configuration panel and interfitting with the circular configuration recessed endwall of the ironing mandrel such that formation of such bottom wall profile exerts a pulling force on the ironed sheet metal in the sidewall of the can body,

such pulling force breaking surface adhesion between the interior surface of the unitary sidewall of the can body and the sidewall of the mandrel so as to facilitate removal of the can body from the ironing mandrel,

removing the ironed sidewall with recessed panel bottom configuration can body from the ironing mandrel, and

necking-in sheet metal contiguous to the open end of the can body to reduce the diameter of such sheet metal and to form flanging metal of cylindrical configuration and a curvilinear configuration transition zone between such reduced diameter cylindrical configuration flanging metal and the remainder of the sidewall of the can body.

3,998,175

MULTI-HULL VESSELS

John H. Piess, 48 Kinnerton St., London, S.W.1, England

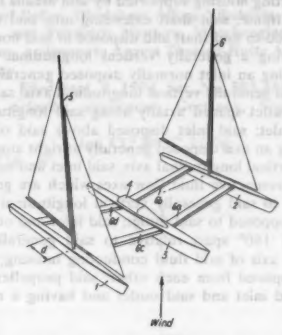
Filed Nov. 27, 1972, Ser. No. 309,791

Claims priority, application United Kingdom, Nov. 29, 1971, 55205/71

Int. Cl.² B63H *9/04*

U.S. Cl. 114—39 **1 Claim**

1. A fore-and-aft rigged trimaran including a central hull and two wing hulls, each of said wing hulls having stepped thereon a vertical mast carrying a boom for extending the foot of a sail hoisted on said mast, one of said masts being stepped back along its hull relative to the other mast, a pair of supporting struts connecting one of said wing hulls to the central hull, a second pair of supporting struts connecting the second of said wing hulls to the central hull, each pair of struts being



inclined upwards from said central hull to the horizontal when said trimaran is afloat with its two masts vertical.

3,998,176

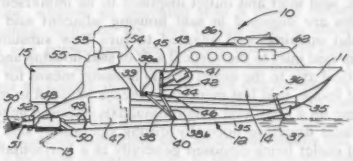
HYDRO-SKI CRAFT

Ernest G. Stout, Glendale, and Francis L. Thornburg, Canoga Park, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Feb. 18, 1975, Ser. No. 550,565

Int. Cl.² B63B *1/18*

U.S. Cl. 114—283 **21 Claims**



1. A hydro-ski craft to be supported on and move along a body of water, comprising:

a hull;

two skis carried by said hull at locations spaced laterally apart;

means mounting said skis to said hull for upward and downward shifting movement relative thereto between upper retracted positions and lower extended positions;

said skis having planing under surfaces which, in at least one vertical setting of the skis, are positioned to contact and plane along the upper surface of said body of water;

flaps carried by said skis respectively for forward and downward movement therewith relative to said hull;

hinge means mounting said flaps at forward edges thereof to rearward portions of said skis respectively for movement therewith, and for movement relative thereto between first positions of extension downwardly and rearwardly from the skis and second higher positions said flaps being power actuatable differentially for controlling roll of said craft.

3,998,177

OUTBOARD MOTOR

William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85014

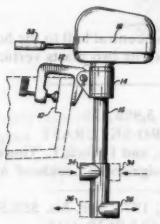
Filed Feb. 24, 1975, Ser. No. 552,413

Int. Cl.² B63H *21/26, 1/04*

U.S. Cl. 115—18 E **1 Claim**

1. In a trolling motor: a frame, a motor mounted on said

frame; means for mounting said motor on said frame; a motor driven shaft disposed to be rotatably driven by said motor; a fluid conducting housing supported by said means for mounting on said frame; said shaft extending into said housing; a propeller fixed to said shaft and disposed in said housing; said housing having a generally vertical longitudinal axis; said housing having an inlet normally disposed generally at right angles to said generally vertical longitudinal axis; said housing having an outlet spaced axially along said longitudinal axis from said inlet; said inlet disposed above said outlet; said outlet having an axis disposed generally at right angles to said generally vertical longitudinal axis; said inlet and outlet openings having respective fluid flow axes which are generally at right angles to said generally vertical longitudinal axis; said inlet being opposed to said outlet; said inlet and outlet being substantially 180° apart relative to said generally vertical longitudinal axis of said fluid conducting housing; said inlet and outlet spaced from each other; said propeller disposed between said inlet and said outlet and having a rotary axis



substantially parallel with said generally vertical longitudinal axis; said inlet and outlet disposed to be immersed in water; vanes are disposed in said housing adjacent said inlet and outlet openings and adapted to turn flow substantially 90° from said inlet to the vertical axis of said housing and from the vertical axis to the outlet of said housing; means for mounting said frame, said last mentioned means adapted to mount said frame on a boat; said longitudinal axis disposed generally in a vertical direction normally during operation; said inlet and said outlet being disposed generally in a horizontal direction when in operation; said vanes are L-shaped in cross section and are arranged in a stepped array relative to each other and said array being disposed diagonally relative to the axes of said inlet and outlet and said longitudinal axjs; said means for mounting said frame having a rotary bearing means adapted to permit 360° rotation of said trolling motor relative to said mounting means whereby 180° rotation of said trolling motor relative to said mounting means provides for reversal of operation of said trolling motor, thereby creating thrust in opposite directions when rotated 180° about said longitudinal axis.

3,998,178

EASY-FIT SIGNAL UNIT FOR MOTOR VEHICLES

Christian Dutot, and Jean Michel Dumontier, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of Paris, France

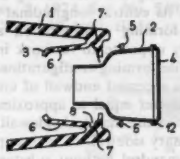
Filed Apr. 9, 1975, Ser. No. 566,400

Claims priority, application France, Apr. 11, 1974, 74.12775

Int. Cl.² B60Q *1/00, 1/02, 1/26*

U.S. Cl. 116—28 R **2 Claims**

1. An easy-fit signal unit for motor vehicles comprising, in combination, a bumper section of molded flexible material having an opening defining a cavity, at least one signal unit disposed within said cavity and means on the inner wall of said cavity and the outer surface of said unit for removably retaining said unit in said cavity, said retaining means comprising an annular lip of flexible material on said bumper section adjacent the forward end of said cavity, said lip being arranged for overlying relationship with the forward marginal edge portion of said unit in the asssembled position of said unit in said cavity and wherein the inner wall of said opening in said bumper section is provided with an annular retaining groove



between said lip and the forward end of said cavity and including a piece of string secured at one end within said groove and having an outwardly projecting other end engageable with said lip to permit said lip to be positioned in said overlying relationship with the forward marginal edge portion of said unit.

3,998,179

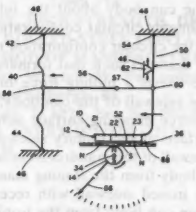
APPARATUS FOR OPERATING A PRESSURE GAUGE OR THE LIKE

Peter D. Dieterich, Boulder, Colo.; William H. Eiszner, Jr., Holland, Mich., and John P. Locke, Michigan City, Ind., assignors to Dover Corporation, New York, N.Y.

Continuation of Ser. No. 425,084, Dec. 17, 1973, abandoned. This application Jan. 13, 1976, Ser. No. 648,639

Int. Cl.² G09F *9/00*

U.S. Cl. 116—129 D **17 Claims**



1. A magnetically coupled motion transmitting mechanism comprising: first permanent magnet means having first and second poles of opposite polarity spaced from one another for rotating movement about a fixed axis therebetween, stop means coacting with the first magnet means to limit the rotational movement thereof to not more than approximately one half revolution, and second permanent magnet means mounted in spaced relation adjacent the first pole of the first magnet means for movement alongside thereof in a direction to rotate said first magnet means, said second magnet means having the surface thereof adjacent the first magnet means provided with a set of at least two poles arranged side-by-side in the direction of movement, said set of poles being alternately of opposite polarity and so spaced relative to one another and to the poles of the first magnet means that the fields thereof overlap and cooperate to define a composite magnetic field of a shape and strength effective upon movement of the second magnet means to exert a substantially greater influence upon the field of the first pole of the first magnet means than upon the field of the second pole thereof throughout the range of limited movement of said first magnet means, and said set of poles also including one pole of opposite polarity to the first pole of the first magnet means and an additional pole of the same polarity as said first pole, said first pole and said pole of opposite polarity being positioned relative to one another and to the stop means such that the magnetic attraction between said unlike poles diminishes as the first magnet

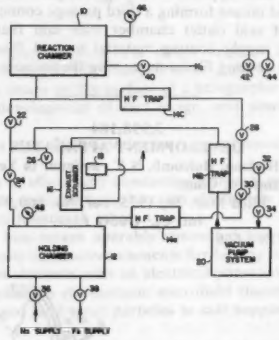
means approaches said stop means upon rotation in at least one direction, and in which said additional pole of the same polarity as said first pole is so positioned relative thereto that repulsive forces exist therebetween of a magnitude effective to gradually override said diminishing attractive forces and exert an increasingly greater influence upon the movement of said first magnet means toward said stop.

3,998,180

VAPOR DEPOSITION APPARATUS INCLUDING FLUID TRANSFER MEANS

Albert W. Hawkins, Princeton, N.J.; Matthew J. O'Hara, Monroe; Frank P. Gortsema, Croton, and Eddie Hedaya, White Plains, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,944
Int. Cl.² C23C *13/08*
U.S. Cl. 118—5 **5 Claims**



1. An apparatus for exposing articles to a gaseous fluid at an essentially predetermined composition wherein said fluid is comprised of or contains one or more components which are reactive with the surface of said articles, said apparatus comprised of in combination:

a. a first sealed reaction chamber having sealable access means for the introduction and removal of said articles;

b. a second sealed chamber having first conduit means connected to at least one source of said fluid and optional sealable access means for the introduction and removal of said articles, whereby said second chamber may optionally be utilized as only a holding chamber for said gaseous fluid or additionally as a second reaction chamber;

c. a conduit system connecting said first and second chamber;

d. vacuum producing transfer means and valve means operatively associated with said conduit system for selectively creating pressure differentials between said chambers, whereby each chamber may be evacuated or charged with said gaseous fluid, and fluids transferred back and forth between said chambers after the fluid treatment of said articles;

e. said apparatus including pressure and temperature control means; and

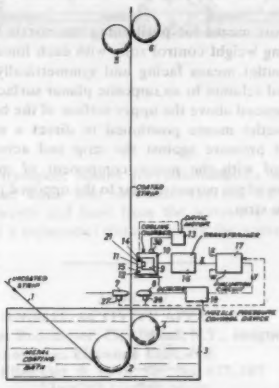
f. means operatively associated with said conduit system and adapted to separate out reaction by-products and contaminants.

3,998,181

APPARATUS FOR SCRAPING METAL COATING ON HOT-COATED METAL STRIPS

Franz-Josef Bellen, Dinslaken; Alfons Nikoleizig, Oberhausen-Holten, and Friedrich Meuters, Monchengladbach, all of Germany, assignors to Aggust Thyssen-Hutte AG, Duisburg, Germany

Filed Sept. 5, 1974, Ser. No. 503,466
Claims priority, application Germany, Sept. 7, 1973, 2345157
Int. Cl.² B05C *11/06*
U.S. Cl. 118—8 **16 Claims**



1. In apparatus for scraping metal coatings of hot-coated metal strips, wherein an uncoated strip is passed through a metal coating bath and the thus coated strip is advanced upwardly and passed between scraping nozzles on opposite sides of the strip and measuring means including an x-ray flourescent-measuring device is disposed downstream of the nozzles for measuring the thickness of the coating to control the scraping effect of the nozzles, an improvement comprising a cooling chamber containing said measuring means and disposed at a location relatively close to said nozzles and spaced from said strip, and means for blowing a gaseous cooling medium into the intermediary space within said chamber, between the metal strip and the measuring means.

3,998,182

CONTINUOUS METALLIC STRIP HOT-DIP METAL COATING APPARATUS

John T. Mayhew, Toronto, Ohio, assignor to National Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 6,136, Jan. 27, 1970, abandoned, which is a division of Ser. No. 598,380, Dec. 1, 1966, Pat. No. 3,499,418, which is a continuation-in-part of Ser. Nos. 282,474, May 22, 1963, abandoned, and Ser. No. 409,053, Nov. 5, 1964, abandoned. This application Oct. 17, 1975, Ser. No. 623,306
Int. Cl.² B05C *11/06*
U.S. Cl. 118—8 **7 Claims**

1. Continuous metallic strip hot-dip metal coating apparatus comprising

a. molten coating metal bath means,

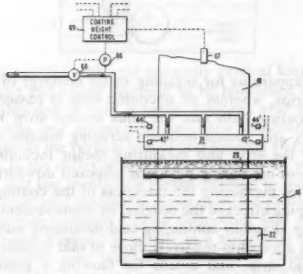
b. roll means defining a travel path for continuous metallic strip through a portion of the molten coating metal of the bath means, thence through a coating weight control zone and upwardly to a point where the molten coating metal applied to the strip in the bath has solidifed, the coating weight control zone extending upwardly from the surface of the molten coating metal through the portion of the travel path in which the weight of the still molten coating metal applied to the strip in the bath can be controlled,

the roll means comprising a first roll submerged in the molten coating metal and a second roll positioned above the bath means at a point where the molten coating metal applied to the strip in the bath means has solidified,

c. nozzle means having two linearly extended, narrow gas outlet means, each gas outlet means having a length at least equal to the width of the strip, each gas outlet means being shaped to deliver a concentrated stream of gas under pressure of shape and mass along the length of the gas outlet means to give a desired coating weight across the width of the continuous metallic strip,

d. means for supplying gas under pressure to the nozzle means,

e. support means for positioning the nozzle means in the coating weight control zone with each linearly extended gas outlet means facing and symmetrically disposed in spaced relation to an opposite planar surface of the strip and spaced above the upper surface of the bath with each gas outlet means positioned to direct a stream of gas under pressure against the strip and across the width thereof with the major component of motion of the stream of gas perpendicular to the opposed planar surface of the strip,



f. gas pressure control means for continuously controlling the mass of gas delivered by each gas outlet means,

g. means for supporting each gas outlet means for movement toward and away from the associated planar surface of the strip,

h. means for measuring the thickness of the coating metal on each associated planar surface of the strip at a point in the strip travel path located past each gas outlet means,

i. means associated with means (h) for producing signals proportional to coating metal thickness measurements of means (h),

j. power means associated with means (g) for moving each gas outlet means toward and away from the associated planar surface of the strip, and

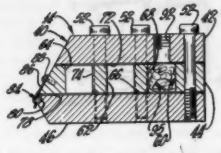
k. means actuated by means (i) for causing power means (j) to operate in response to the signals produced by means (i) for adjusting the distance between each gas outlet means and the associated planar surface of the strip in accordance with changes in the coating metal thickness measurements of means (h) to control the amount of molten coating metal removed from each associated planar surface of the strip in the coating weight control zone to thereby control the coating metal weight on said associated planar surface of the product.

3,998,183

COATING MATERIAL APPLICATOR

John L. Kane, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 12, 1975, Ser. No. 557,735
Int. Cl.² B05C 3/15
U.S. Cl. 118—420 **25 Claims**



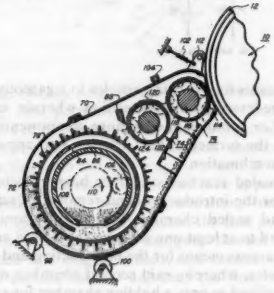
1. An applicator for applying a coating material to a plurality of filaments moving in lineal paths in side-by-side relationship, said applicator comprising means forming an inlet chamber, an intermediate chamber, and an outlet chamber, means forming a first passage between a lower portion of said inlet chamber and a lower portion of said intermediate chamber, means forming a second passage between an upper portion of said intermediate chamber and an upper portion of said outlet chamber, said applicator having elongate filament-coating means, and means forming a third passage connecting a lower portion of said outlet chamber with said filament-coating means to supply coating material to said filament-coating means for coating filaments moving thereacross.

3,998,184

DEVELOPMENT APPARATUS

David H. Hudson, Holcomb, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 20, 1975, Ser. No. 560,073
Int. Cl.² G03G 15/09
U.S. Cl. 118—658 **10 Claims**



1. An apparatus for rendering a latent image visible, including:

a housing member defining a chamber for storing a supply of particles therein;

means for depositing particles on the latent image;

a cylindrical member mounted rotatably in said housing member to advance the particles from the chamber therein to said depositing means, said cylindrical member having a plurality of spaced buckets secured to the peripheral surface thereof and extending lengthwise in a direction substantially parallel to the longitudinal axis of said cylindrical member, each of the buckets having a pair of spaced walls extending substantially radially outwardly from the peripheral surface of said cylindrical

member with one of the pair of walls extending a greater radial distance than the other one of the pair of walls; and

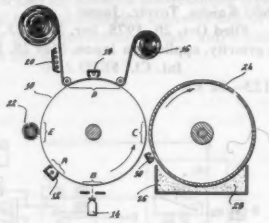
means for rotating said cylindrical member in a direction such that the one of the pair of walls extending a greater detail radial distance than the other one of the pair of walls trails the latter.

3,998,185

MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS FOR THEIR MANUFACTURE

Ernest A. H. Weiler, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 3, 1975, Ser. No. 546,589
Int. Cl.² G03G *15/08*
U.S. Cl. 118—651 **15 Claims**



1. A xerographic microfield donor member adapted to transport triboelectrically charged toner particles to a latent electrostatic image on the surface of a xerographic photoconductor for development of said image, said donor member comprising

an endless electrically conductive support member including

a plurality of electrically conductive elements separated by dielectric material to isolate said electrically conductive elements from each other,

electrical bias means operably connected to each of said electrically conductive elements for biasing each pair of adjacent elements with an electrical potential difference to establish an electrostatic microfield therebetween to attract and hold toner particles to said support member, and

means for continuously reversing the electrical bias of each pair of adjacent elements as said donor transports said toner particles to said photoconductor for alternately repelling and attracting said toner particles to said support member to cause agitation of said toner particles on said support member and when said toner particles are adjacent the surface of said xerographic photoconductor to effect nullification of the electrical microfield attracting the particles to said support member.

3,998,186

METHOD AND APPARATUS FOR CONTROLLED-ENVIRONMENT SHRIMP CULTURE

Carl N. Hodges, Tucson, Ariz., assignor to Resorts International, Inc., North Miami, Fla.

Filed Jan. 15, 1975, Ser. No. 541,249
Int. Cl.² A01K *61/00*
U.S. Cl. 119—2 **8 Claims**

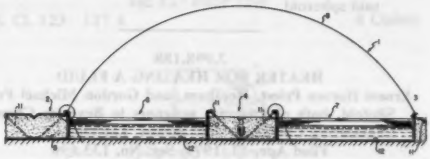
5. Apparatus for feeding shrimp to increase their weight to marketable size comprising

a. an elongated foundation member;

b. an elongated waterway connected to to said foundation for holding natural seawater or water having the dissolved oxygen, temperature, pH, salinity and other characteristics of natural seawater and holding shrimp and algae;

c. a walkway adjacent the waterway to provide access for workers tending the shrimp;

d. translucent covering means supported over and enveloping the waterway and the walkway to form an enclosure in which the air temperature can be controlled; and



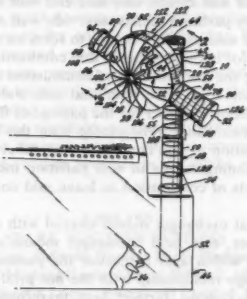
e. water transport means for intermittently introducing additional water into the waterway and for removing water, waste and food from the waterway after it has traveled a substantial distance along the waterway.

3,998,187

ANIMAL ACTIVITY APPARATUS

Donald James Rodemeyer, City Island, N.Y., assignor to Metaframe Corporation, Elmwood Park, N.J.

Filed Oct. 9, 1975, Ser. No. 621,107
Int. Cl.² A01K *29/00*
U.S. Cl. 119—29 **1 Claim**



1. An animal activity apparatus, comprising:

a revolvable spheroid having an inner surface along which an animal is freely movable, said spheroid having a predetermined axis-of-rotation and being provided with an opening concentric with said axis-of-rotation, said spheroid also including a pair of hollow members mounted on the outer surface of said spheroid in communication with the inner surface of said spheroid, whereby said animal may run along said inner surface and enter said hollow members, said hollow members each having a major axis normal to said axis-of-rotation, said hollow members extending from said spheroid in locations which lie approximately 180° apart;

a stationary member rotatably mounting said spheroid, said stationary member including a shaft rotatably engaging said spheroid and a cup-like member mounted in said opening in said spheroid, said cup-like member having an access opening provided therein in communication with said opening in said spheroid, whereby said animal may enter and leave said spheroid;

a tubular member connected to said stationary member in communication with said access opening in said cup-like member; and

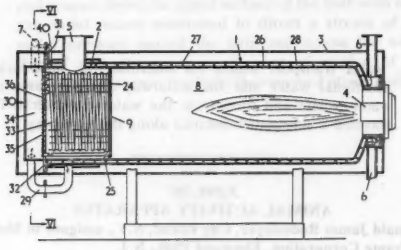
an animal cage connected to said tubular member for placing said cage in communication with said access opening in said cup-like member, whereby said animal may leave said cage, travel through said tubular member and enter said spheroid.

3,998,188

HEATER FOR HEATING A FLUID

Ernest Horace Priest, Horsham, and Gordon Michael Priest, Slinfold, both of England, assignors to Beverley Chemical Engineering Company, Ltd., Sussex, England

Filed Apr. 13, 1971, Ser. No. 133,696
Int. Cl.² F22B 21/26
U.S. Cl. 122—250 R 1 Claim



1. A heater for heating a fluid using hot products of combustion, the heater comprising

at least one combustion chamber having side wall means and end wall means, one said end wall means being defined by partition means, said side wall means extending beyond said partition means to form an extension,

a burner for burning a fuel in said combustion chamber and passing the hot products of combustion therethrough,

duct means associated with said side wall means of said combustion chamber for the passage of fluid to be heated in heat-exchange relationship with the hot products of combustion in said combustion chamber,

outlet opening means in said partition means for the hot products of combustion to leave said combustion chamber,

and a heat exchanger means coaxial with said combustion chamber, said heat exchanger means comprising duct means within said extension for passing fluid in heat-exchange relationship with the hot products of combustion to remove further heat therefrom, whereby said combustion chamber forms part of and defines said heat exchanger means which comprises a first heat exchanger in which fluid absorbs primarily radiant heat from the hot products of combustion and a second heat exchanger, wherein fluid absorbs primarily convected heat from the hot products of combustion,

said second heat exchanger comprises an end wall remote from said first heat exchanger and further comprises a double-header arrangement for fluid on the outside of said end wall of said second heat exchanger, the said double-header arrangement comprising

chamber means,

an inlet for fluid to be heated,

an outlet for heated fluid,

flow and return connections defined in said end wall for said flow ducts of said second heat exchanger,

a first partition dividing said chamber means approximately diametrically,

a second partition substantially parallel to and spaced a small distance from said end wall of said second heat exchanger,

said first and second partitions dividing said chamber means into main inlet and outlet headers and narrow flow and return chambers,

first openings defined in said second partition adjacent the periphery of said chamber means to provide respective communications between said inlet header and said flow chamber and between said return chamber and said outlet header,

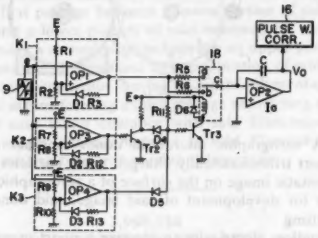
and further openings remote from said first openings to provide respective communications between said flow and return connections and said flow and return chambers.

3,998,189

FEEDBACK AIR-FUEL RATIO REGULATOR

Keiji Aoki, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 20, 1975, Ser. No. 623,790
Claims priority, application Japan, May 28, 1975, 50-62847
Int. Cl.² F02D 3/00
U.S. Cl. 123—32 EA 9 Claims



1. In combination with an internal combustion engine, a feedback air-fuel ratio regulator comprising an air-fuel ratio sensor which determines air-fuel ratio of a combustible gas from the composition of the engine exhaust gas and produces a sudden change in its output at a preset theoretical air-fuel ratio, and an electronic air-fuel ratio controlling circuit including voltage detectors for detecting output voltage of the air-fuel ratio sensor at two or more points corresponding to certain richer and leaner air fuel ratios than the theoretical one, switching means actuated by the output of the voltage detectors, and an integrating circuit having a time constant determined by a condenser and a resistance selected by the switching means, whereby the amount of fuel to be injected is regulated by the output of the integrating circuit which in turn is determined by selection of said time constant in accordance with said voltage.

3,998,190

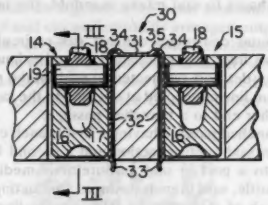
ROLLER FOLLOWER WITH ANTI-ROTATION RETAINER

Frank Edward Keske, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 13, 1975, Ser. No. 586,848
Int. Cl.² F01L 1/14
U.S. Cl. 123—90.5 11 Claims

9. In combination with an engine block having at least one pair of bores defined therein and on either side of a bridging portion thereof, a non-rotating roller-follower system comprising a roller-follower means reciprocally mounted in each of said bores, at least one flat surface formed on each of said roller-follower means to extend axially thereon, and a one-piece anti-rotation means for preventing rotation of each of said roller-follower means relative to said block comprising a U-shaped member having a pair of leg portions straddling the bridging portion of said block and extending through a respective one of said bores to engage the flat surface formed on a

respective one of said roller-follower means for preventing rotation thereof relative to said block, a base portion disposed on one side of the bridging portion of said block and interconnected between said leg portions and retaining means formed on each of said legs and engaging a second side of said block for preventing axial movement of said anti-rotation means relative to said block.

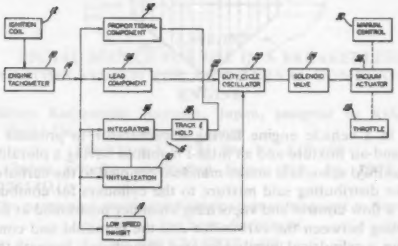


3,998,191

ENGINE SPEED LIMITING CONTROL CIRCUIT

David G. Beyerlein; Roland G. Kibler, and Bruce H. Van Vlack, all of Flint, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1975, Ser. No. 562,680
Int. Cl.² F02D 11/10
U.S. Cl. 123—102 3 Claims



1. In a system for limiting engine speed to near a governed value having means for limiting engine speed, a control circuit for actuating the limiting means comprising

means for producing an electrical speed signal proportional to engine speed,

a modifying circuit responsive to the speed signal for producing a control signal for energizing the limiting means as a function of engine speed,

the modifying circuit including means for producing one component of the control signal having initially high value at low engine speed, gradually decaying to a lower value as the speed increases to intermediate engine speeds and increasing to high value at high engine speeds, the control signal being effective during intermediate and high speeds to energize the limiting means to a degree dependent on the signal value,

and means for preventing energizing of the limiting means at low engine speeds,

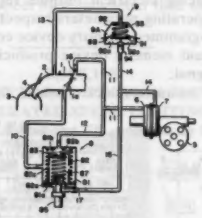
whereby the control circuit is conditioned to provide an energizing signal to the limiting means sufficient to limit engine speed near a governed value for both gradual and sudden engine acceleration.

3,998,192

IGNITION TIMING CHANGE-OVER DEVICE

Isamu Ota, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Feb. 18, 1975, Ser. No. 550,670
Claims priority, application Japan, Aug. 31, 1974, 49-100020
Int. Cl.² F02P 5/06
U.S. Cl. 123—117 A 4 Claims



1. An ignition timing change-over system for connection to an intake manifold of an engine and to a carburetor having a throttle valve for supplying a mixture into the engine and to a distributor having a breaker plate therein, comprising: an ignition timing advancer for connection to a point upstream of the throttle valve for causing the breaker plate to rotate toward an ignition timing advancing direction; an ignition timing retarder for causing the breaker plate to rotate toward an ignition timing retarding direction; a first valve unit responsive to a temperature of the engine and to a predetermined high vacuum pressure in the intake manifold for connecting said ignition timing advancer to a point downstream of the throttle valve when the temperature of the engine is lower than a predetermined level and connecting said ignition timing retarder to the point downstream of the throttle valve when the temperature of the engine is higher than the predetermined level; a second valve unit responsive to the predetermined high vacuum pressure in the intake manifold for communicating said ignition timing retarder with the atmosphere through said second valve unit when the high vacuum pressure arises in the intake manifold and preventing a communication of said ignition timing retarder with the atmosphere when there is no high vacuum pressure in the intake manifold.

3,998,193

SPARK IGNITION SYSTEMS

Andrew Peter Ives, Solihull; Duncan Barry Hodgson, Leamington Spa, and Michael Herbert Cops, Solihull, all of England, assignors to Joseph Lucas (Electrical) Limited, Birmingham, England

Continuation of Ser. No. 492,329, July 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 311,426, Dec. 1, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,364
Claims priority, application United Kingdom, Dec. 21, 1971, 59504/71
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 R 5 Claims

1. A spark ignition system for an internal combustion engine, comprising:

a semi-conductor switch drivable between first and second states, in one of which states said switch is on and in the other of which states said switch is off;

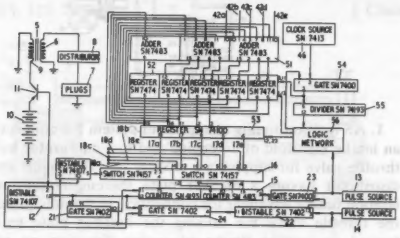
means operable to produce a spark in response to said switch being driven from said first state to said second state;

a pulse source means controlled by the engine crankshaft for producing both a control pulse when the crankshaft is in a predetermined datum position and a succession of timing pulses following each control pulse;

digital control means including first means for producing a first digital output signal which at any given instant represents the angle between said datum position and the crankshaft angle, starting from said datum position, at which the spark is required, and second means for producing a second digital output signal representing the crankshaft angle, starting from said datum position, at which said switch is required to be driven from said second state to said first state;

said first means including first and second transducer means for producing electrical outputs representing first and second operating parameters respectively of the engine, and a programmed memory device coupled to said transducers, said memory device producing said first digital output signal;

comparator means connected to said digital control means;



first bistable circuit means connected to said pulse source and operable in response to each control pulse for loading said comparator means with said first digital output signal, said comparator means producing a first output signal for driving said semi-conductor switch from said first state to said second state when the number of timing pulses received by said comparator means following the control pulse is equal to said first digital output signal; and

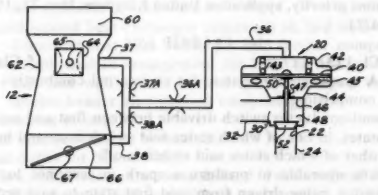
second bistable circuit means for feeding said second digital output signal to said comparator means to produce a second output signal for driving said semi-conductor switch from said second state to said first state when the number of timing pulses received following the control pulse equals said second digital output signal.

3,998,194

SYSTEM FOR CONTROL OF EXHAUST GAS RECIRCULATION

Juris Berzlapa, Hazelwood, Mo., assignor to ACF Industries, Incorporated, St. Louis, Mo.

Filed Sept. 4, 1975, Ser. No. 610,101
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **4 Claims**



1. In an internal combustion engine having an intake manifold for conducting an air/fuel mixture to the cylinders or said engine, an exhaust manifold for conducting products of combustion away from said engine, a carburetor having an air/fuel mixing passage, a constricted venturi section in said passage, a throttle valve for controlling the quantity of mixture delivered to said intake manifold and an exhaust gas recirculation system for recirculating a controlled volume of exhaust gases from said exhaust to said intake manifold, the improvement comprising:

A. A vacuum controlled exhaust gas recirculation valve having an inlet port connected to said exhaust manifold and an outlet port connected to said intake manifold,

B. a vacuum line connected at one end to the said valve and at its other end to a branched passage,

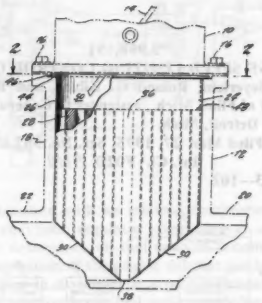
C. said branched passage having a first branch connected to a port in said venturi section and a second branch connected to a port in said carburetor immediately above said throttle, said branch passages conducting a pressure from each of said ports to said vacuum line whereby a resultant combined pressure is imposed on said vacuum controlled valve.

3,998,195

FLOW CONTROL AND VAPORIZING CHAMBER

Alfred E. Scott, 323 Aster Road, West Islip, N.Y. 11795

Filed Feb. 3, 1975, Ser. No. 546,805
Int. Cl.² F02M *29/04*
U.S. Cl. 123—141 **10 Claims**



1. In a vehicle engine having a carburetor to produce a fuel-and-air mixture and an intake manifold having a plurality of manifold arms, said intake manifold coupled to the carburetor for distributing said mixture to the cylinders for combustion, a flow control and vaporizing chamber positioned at the coupling between the carburetor and the manifold and comprising, a cylindrical member located immediately beneath the carburetor, said cylindrical member including a trunk portion and a base portion, the outer diameter of said trunk portion snugly fitting into the intake manifold and at least a part of said base portion resting on the inside of the manifold frame, and a plurality of closely spaced longitudinally extending tubes located within said cylindrical member for receiving said fuel-and-air mixture from the carburetor and breaking up the fuel in said mixture, and wherein said base portion is shaped to provide an angular face at each manifold arm, the bottoms of said tubes terminating at said faces for directing the mixture to the cylinders.

3,998,196

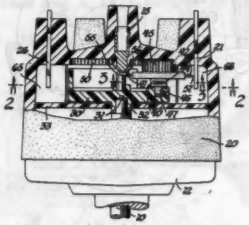
IGNITION DISTRIBUTOR

Ronnalee House, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 16, 1975, Ser. No. 596,387
Int. Cl.² H01N *19/12*
U.S. Cl. 123—146.5 A **5 Claims**

1. An internal combustion engine ignition distributor for sequentially directing ignition spark energy produced by an ignition coil to the spark plugs of an associated internal com-

bustion engine comprising: a base member, a shaft member rotatably supported by said base member, a plurality of output terminals, each corresponding to a respective spark plug of said associated internal combustion engine supported in a circumferential arrangement, an input terminal supported at the center of said circumferentially arranged output terminals, a rotor member of insulating material mounted upon and arranged to be rotated by said shaft member, a movable electrical contact having at least one pair of diametrically opposed tip portions rotatably mounted upon said rotor member at a



location at which it is revolved by said rotor member through a circular path about the axis of said shaft member as said rotor member is rotated by said shaft member, and driving means for rotating said movable electrical contact while it is revolved about the axis of said shaft member by said rotor member, said movable electrical contact being so arranged that, as it is rotated by said driving means, each successive one of said tip portions thereof is rotated into electrical circuit relationship with the next successive one of said output terminals and the said diametrically opposed tip portion is rotated into electrical circuit relationship with said input terminal.

3,998,197

SIGNAL SOURCE FOR USE IN A BREAKERLESS IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Mitsuo Katsumata, Numazu, Japan, assignor to Kokusan Denki Co., Ltd., Numazu, Japan

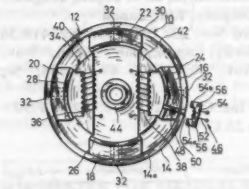
Filed Nov. 1, 1974, Ser. No. 520,140

Claims priority, application Japan, Feb. 11, 1973, 48-127514[U]

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 CC **5 Claims**



1. In a combination of a flywheel magneto generator for a breakerless ignition system for use in an internal combustion engine, said generator comprising a rotor including a bowl-like flywheel of magnetic material, a plurality of permanent magnets spaced from each other and mounted on the inner surface of said flywheel and respective pole pieces mounted on said magnets at the inner faces thereof, and a stator including generating coil means disposed inside said rotor and closely spaced from said pole pieces of said rotor, a signal source comprising at least one of said permanent magnets on said flywheel, timing pole means of magnetic material having one end directly connected to said pole piece on said one permanent magnet and extending from said one end exteriorly of said one permanent magnet to a second end disposed at the outer periphery of said flywheel and magnetically insulated from said flywheel, and signal coil means disposed outside said flywheel and in a closely spaced relationship with said timing pole means second end so that said signal coil means is interlinked through said timing pole means with magnetic flux of said one permanent magnet, said permanent magnets being secured to said flywheel by means other than said timing pole means.

3,998,198

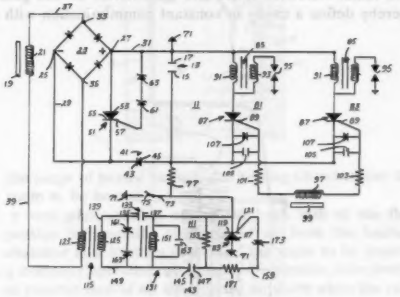
CAPACITOR DISCHARGE IGNITION SYSTEM WITH FREQUENCY OPERATED SPEED LIMITING CONTROL

Richard F. Jereb, Lindenhurst, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Apr. 21, 1975, Ser. No. 570,033

Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 CC **15 Claims**



1. A capacitor discharge ignition system with speedlimiting capability, said system comprising a charge capacitor, first relatively rotatable magnet and coil means for generating alternating potential, means connected between said means for generating alternating potential and said capacitor for applying said potential to charge said capacitor, second relatively rotatable magnet and coil means for generating potential, first switch means connected to said capacitor for discharging said capacitor to generate a spark in response to the application thereto of a first trigger signal generated by said second relatively rotatable magnet and coil means, second switch means connected to said capacitor for preventing charging of said capacitor in response to the application of a second trigger signal, and a signal generating circuit connected to said second switch means and to said first relatively rotatable magnet and coil means and operative to generate said second trigger signal in response to rotation above a predetermined speed of said first relatively rotatable magnet and coil means, said second signal generating circuit including a transformer connected to said first relatively rotatable magnet and coil means.

3,998,199

SUPERCHARGED INTERNAL COMBUSTION ENGINES

Jean Melchior, Paris, France, assignor to The French State, Paris, France

Continuation-in-part of Ser. No. 344,513, March 26, 1973, abandoned. This application Mar. 6, 1975, Ser. No. 555,740

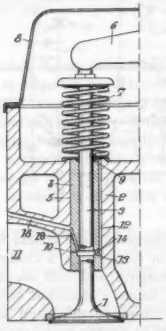
Claims priority, application France, July 18, 1974, 74.24952

Int. Cl.² F01L *3/00*

U.S. Cl. 123—188 GC **24 Claims**

1. In a combination with an intake and exhaust valve sys-

tem, a valve lubrication system for a supercharged internal combustion engine having at least one poppet valve and an associated valve guide mounted in the engine, said valve having a stem with a constant diameter portion slidably mounted with a sliding fit in a constant diameter throughbore of said valve guide so as to define an oil lubricating clearance space radially between said stem and bore and open at the opposite ends of said guide such that oil fed into said radial clearance space is able to lubricate said stem in said guide bore by the oil pumping effect induced by reciprocation of said stem sliding in said bore, the improvement wherein the end of said valve stem remote from the valve poppet protrudes from one end of said guide into a shielded chamber housing valve actuating means cooperable with said stem to reciprocate said valve, said valve actuating means being lubricated by oil in said chamber to which said one end of said valve guide is exposed to thereby provide a first oil supply means for feeding oil into the associated end of said radial clearance space for lubricating said stem in said guide bore by said oil pumping effect, said valve guide having first passageway means disposed circumferentially about and extending radially of said guide between said radial clearance space and the exterior of said guide to thereby define a cavity in constant communication with said



radial clearance space, said first passageway means being spaced from the other end of the valve guide which is closest to the valve poppet by a distance measured axially of said stem approximately equal to the diameter of the valve stem, said radial clearance space thus extending axially between said cavity and said one end of said guide and between said cavity and the other end of said guide, said valve guide having second passageway means constantly communicating said first passageway means with a pressure relief zone wherein the pressure is approximately atmospheric, and second oil supply means comprising an oil supply conduit in constant communication with said passageway means to supply oil at least via said first passageway means to said radial clearance space for lubricating at least the portion of said guide bore extending axially from said first passageway means to said other end of said guide by said pumping effect induced by reciprocation of said stem sliding in said bore past said first passageway means, said second passageway means serving to conduct oil away from said first passageway means to said pressure relief zone and also serving to prevent gas from flowing along said radial clearance space to said pressure relief zone while permitting the reciprocating movement of the stem to build a lubricating oil film throughout said clearance space.

3,998,200

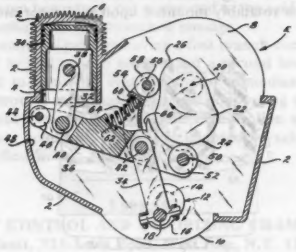
RECIPROCATING ENGINE

Kenneth J. Sudholt, 3801 Fair Oaks Drive, Granite City, Ill. 62040

Filed Oct. 16, 1974, Ser. No. 515,190

Int. Cl.² F02B 75/32

U.S. Cl. 123—197 R **8 Claims**



1. An engine comprising: a block having at least one cylinder; a piston movable axially in the cylinder through a power stroke and other strokes; a crankshaft rotatable in the block; linkage means between piston and the crankshaft for coupling the two together such that crankshaft rotates in a predetermined relation to the axial reciprocating movement of the piston in the cylinder, the linkage means including a lever arm, a piston connecting rod extended between the piston and the lever arm and being pivotally connected to the lever arm, and a crank connecting rod pivotally connected to the lever arm and to the crankshaft in offset relation to the axes of rotation thereof; and positioning means acting on the lever arm of the linkage means to position the linkage means such that a full stroke of the piston is translated into less than 180° of rotational movement for the crankshaft, the positioning means including a cam which rotates in predetermined relation to the crankshaft and bears against the lever arm beyond the location where the connecting rod is pivotally connected to the lever arm and such that the connecting rod is pivotally connected to the lever arm between the pivotal connection of the piston connecting rod to the lever arm and the point at which the cam bears against the lever arm.

3,998,201

CONCRETE BREAKER

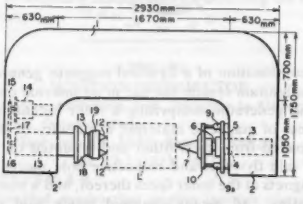
Mitsuo Miura, Tokyo; Masahiro Takigawa, Ashiya; Masao Miyaguchi, Tokyo; Hiromichi Yamada, Tokyo; Iwao Uchizaki, Tokyo; Minoru Ochiai, Tokyo, and Yoshihiro Ishikawa, Nishinomiya, all of Japan, assignors to Takenaka Komuten Company, Ltd., Japan

Filed Nov. 23, 1973, Ser. No. 418,361

Claims priority, application Japan, Nov. 29, 1972, 47-120094; Nov. 30, 1972, 47-120485; Sept. 8, 1973, 48-101567

Int. Cl.² B02C 1/00; B28D 1/32

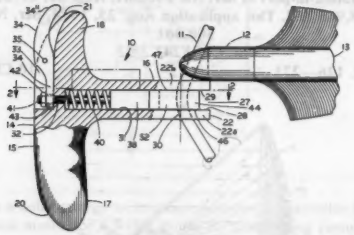
U.S. Cl. 125—23 C **9 Claims**



8. A concrete breaker adapted to break a concrete structure by means of a static compressive force comprising:

a. a frame;
b. a jack mounted on said frame;
c. a chisel receiving bed provided at the end of said jack;
d. a chisel attached to said chisel receiving bed; and
e. means located on said chisel receiving bed for tilting the edge of said chisel out of alignment with the axis of said jack, said means including a plurality of mini-jacks.

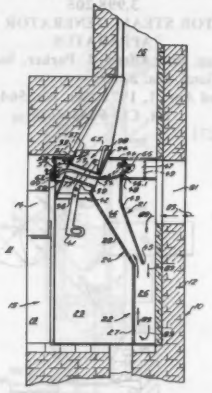
3,998,202
BOWSTRING RELEASE DEVICE
Frank E. Boyko, 806 DeSale St., Vienna, Va. 22180
Filed Aug. 4, 1975, Ser. No. 601,404
Int. Cl.² F41C *19/00*
U.S. Cl. 124—35 A **6 Claims**



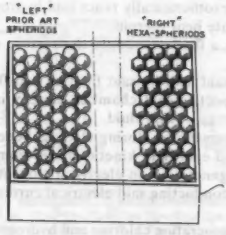
1. A bowstring pulling and release device comprising a one piece, T-shaped body including an elongated handle portion providing the crossbar of said T-shaped body and being formed to be held vertically in one hand with fingers encircling the handle portion and with thumb extending upwardly along one side thereof, and a leg portion extending outwardly from the handle portion opposite said one side and terminating in an outer free end portion, a bowstring receiving notch formed in said free end portion, a transverse slot passing through said free end portion and the plane of said slot being normal to a string and locked bowstring receiving notch, lock means pivotally mounted in said transverse slot for releasably locking a bowstring in said notch, and enlarged bore extending longitudinally through said leg portion from said transverse slot into said handle portion, said leg portion being closed around said enlarged bore, a reduced bore extending from aid enlarged bore through said handle portion, a latch pin slidably mounted in said enlarged bore, said latch pin having a latch detent at one end and a longitudinal extension at its other end extending through said reduced bore, spring means within said enlarged bore for biasing said latch pin outwardly into said transverse slot, a release lever pivotally mounted along said one side of said handle portion opposite said leg portion, means for operatively connecting said release lever to said longitudinal extension of said latch pin for retracting said latch pin and limiting the motion of said latch pin toward said free end portion, aid lock means having an abutment engagable with said latch detent for securing said lock means in latched position for retaining a bowstring until said latch pin is withdrawn by operation of said release lever.

3,998,203
AIR HEATER FOR FIREPLACES
Peter Jarl Jensen, 1946 Northfield Road, Nanaimo, B. C., Canada
Filed Mar. 19, 1975, Ser. No. 559,920
Int. Cl.² F24B *7/04*
U.S. Cl. 126—122 **3 Claims**

1. A fireplace heater, for installation in a fireplace in a room, comprising:
a. a lower grate portion open at its front and having a hollow back wall forming a heating chamber, said heating chamber being open at its lower end for receiving air from outside the room to be heated,
b. an upper flue portion having front and side walls and having a hollow back wall communicating with the hollow back wall of the lower grate portion so as to form a common heating chamber,
c. a plurality of air ducts extending transversely from back to front through the flue portion in the path of heated gases passing upwards through the flue portion, said ducts opening at inner ends into the heating chamber and opening out of the front wall of the flue portion for enabling discharge of heated air from the heating chamber into the room to be heated.
d. a vent pipe opening out of the back wall of the flue portion for enabling discharge of air from the heating chamber to a location outside of the room to be heated.
e. a manually operated valve assembly operable, selectively, to prevent flow of air through the air ducts when the vent pipe is open and to close the vent pipe to the passage of air when the air ducts are open.



3,998,204
FLOATABLE BALL
Francis J. Fuchs, and Dorothy J. Fuchs, both of 9 University Way, Princeton, N.J. 08540
Filed May 13, 1975, Ser. No. 577,100
Int. Cl.² F24J *3/02*
U.S. Cl. 126—270 **11 Claims**



1. A floatable ball, a plurality of which floatable balls are for providing a gapless floating ball blanket, comprising:
a modified spheroid made of predetermined floatable material;
the modified spheroid is provided with a predetermined number of flat surfaces around the equator thereof, the flat surfaces provide the modified spheroid with an equatorial cross-section the outline of which is a closed plain

figure comprised of interconnected straight lines equal in number to said predetermined number and wherein a vertical cross-section taken across the modified spheroid at diametrically opposed junctures of adjacent flat surfaces is a circle; and

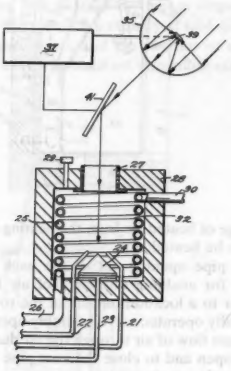
whereby a plurality of said floatable balls are engageable in flat surface-to-surface contact at said flat surfaces around the equators thereof to provide a gapless floating ball blanket.

3,998,205

SOLAR REACTOR STEAM GENERATOR METHOD AND APPARATUS

Robert L. Scragg, and Alfred B. Parker, both of 2937 SW. 27th Ave., Miami, Fla. 33133

Filed Apr. 1, 1975, Ser. No. 564,087
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **16 Claims**



1. A method of storing electrical energy and converting said stored energy to kinetic energy comprising the steps of:

generating an electrical current,

conducting said electrical current to an electrolysis cell,

generating chlorine and hydrogen in an electrolysis cell, said generating step being sustained by said generated electrical current,

controllably coupling said chlorine and hydrogen to a chamber of a solar reactor,

directing electromagnetic radiation into said chamber to thereby exothermically react said hydrogen and chlorine to generate heat therein,

conducting a fluid proximate the surface of said chamber, and

absorbing said heat by said fluid as said fluid is conducted with respect to said chamber thereby increasing the kinetic energy of said fluid.

10. An apparatus for storing electrical energy and converting said stored energy to kinetic energy comprising:

means for generating an electrical current,

means for conducting said electrical current to an electrolysis cell,

means for generating chlorine and hydrogen in said electrolysis cell, said hydrogen and chlorine generating means being energized by said electrical current,

means for controllably coupling said chlorine and hydrogen to a chamber of a solar reactor,

means for directing electromagnetic radiation into said chamber to thereby exothermically react said hydrogen and chlorine to generate heat therein,

means for conducting a fluid proximate the internal surface of said chamber, and

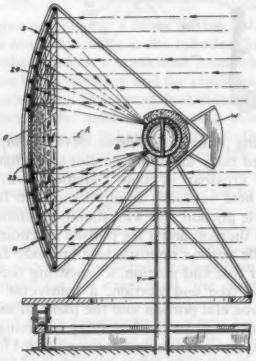
means for conducting said fluid away from said chamber after said fluid has absorbed heat generated by said exothermic reaction.

3,998,206

SYSTEM FOR COLLECTING AND UTILIZING SOLAR ENERGY

Arnold Jahn, 1124 N. Elm St., Fairmont, Minn. 56031

Continuation-in-part of Ser. No. 393,561, Aug. 31, 1973, Pat. No. 3,905,352. This application Aug. 23, 1974, Ser. No. 500,061
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **10 Claims**



1. An earth-based, sun-tracking system for collecting and utilizing solar energy having in combination:

a reflector-supporting medium mounted on earth or orbital travel through a curvilinear path extending transversely to the vertical,

means synchronized with the horizontal increment of the sun's trajectory for driving said supporting medium through its orbital travel,

a substantially parabolic, solar ray reflector mounted on said supporting medium for up and down swinging movement on a substantially horizontal axis,

reversible driving means controlled by the elevational increment of the sun's trajectory for swinging said reflector during its orbital travel to constantly focus said reflector on the sun between sunrise and sunset, and

a stationary solar generator mounted independently of said reflector-supported medium and having a generally spherical exterior surface constructed of material for absorbing solar rays and having a substantially vertical center line disposed axially of the travel orbit of said supporting medium,

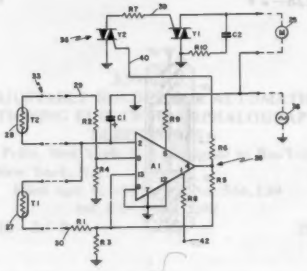
said generator having a horizontal center line disposed elevationally at least close to the horizontal axis of said reflector, whereby oscillation of said reflector through somewhat in excess of 90° between lowest swinging movement at sun's highest elevational position and uppermost swinging position at sunrise and sunset will provide for focusing of said reflector on the sun during substantially a full day of the sun's trajectory.

3,998,207

DIFFERENTIAL TEMPERATURE CONTROLLER FOR USE IN A SOLAR ENERGY CONVERSION SYSTEM

Richard Edwin Watt, San Diego, Calif., assignor to Richard Edwin Watt, San Diego, Calif.

Filed Jan. 26, 1976, Ser. No. 652,640
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—271 23 Claims



1. In a solar energy conversion systems, a controller for an electrical motor for a water pump for controlling circulation of water between a solar energy collector and a water storage sump in response to sensed predetermined differences between the temperature of the collector water and the temperature of the sump water, comprising:

first means for comparing said sensed temperatures and for providing a first indication when it is sensed that said collector water temperature has become greater than said sump water temperature by a first predetermined difference and a second indication when it is sensed that said collector water temperature has become greater than said sump water temperature by a second lesser predetermined difference;

second means for latching the first means to continuously provide said first indication from the time that it is sensed that the temperature of the collector water has become greater than the temperature of the sump water by said first predetermined difference until such time as it is sensed that the temperature of the collector water has become greater than the temperature of the sump water by said second lesser predetermined difference and for latching the first means to continuously provide said second indication from the time that said second lesser predetermined difference is sensed until such time as said first predetermined difference is sensed; and

thyristor means for switching said pump motor into connection with an alternating current power source to cause circulation of said water when said first indication is provided by the first means and out of connection with said power source when said second indication is provided by the first means.

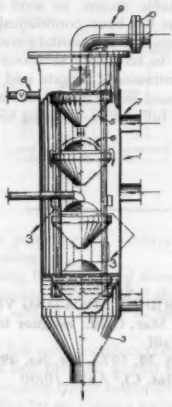
3,998,208

LIQUID HEATER DEVICE

Harry I. Abboud, Baton Rouge, La., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed June 16, 1975, Ser. No. 587,494
Int. Cl.[2] F24H 1/10
U.S. Cl. 126—377 4 Claims

1. A device for heating liquids, slurries and the like by the condensation of steam on liquid surfaces comprising the combination of an elongated vessel for heating said liquids, the vessel including a substantially cylindrical housing means, said housing means being provided at its lower end with a cone-shaped bottom member, the top portion of the cylindrical housing means being provided with a liquid inlet means and the bottom portion thereof being provided with a liquid discharge means, the cylindrical housing having a plurality of spaced liquid treatment zones arranged within the interior thereof, at least one of said zones having a circular, substantially horizontal tray disposed therein in such a fashion so that its center point substantially coincides with the vertical axis of said cylindrical housing means while its diameter is smaller than the inner diameter of the cylindrical housing means to provide an annular space through which the liquid can flow downwardly from a liquid treatment zone, a cone-shaped



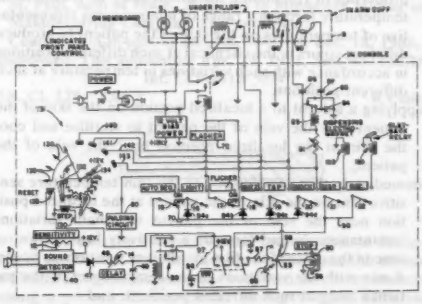
underflow means located below the tray, said cone-shaped underflow means having a bottom opening and downwardly and inwardly converging side walls to provide the liquid downwardly flowing from the tray with a convergent flow; and a hemispherically shaped impingement means located below the bottom opening of the cone-shaped underflow means to effect a subsequent, divergent flow of liquid exiting from the bottom opening of said underflow means and said zone also including means for introducing steam into the housing means at a point below the bottom opening of said underflow means.

3,998,209

SNORING DECONDITIONING SYSTEM AND METHOD

Gilbert S. Macvaugh, 4402 Stanford St., Chevy Chase, Md. 20015

Filed Dec. 16, 1975, Ser. No. 641,226
Int. Cl.[2] A61B 19/00
U.S. Cl. 128—1 R 12 Claims



1. In combination:

means responsive to audible snoring coming from a sleeper, said means producing an output signal when said snoring has exceeded a predetermined level of loudness for a predetermined time;

means responsive to said output signal for producing aversive stimuli and applying said aversive stimuli to said sleeper, whereby said snoring sleeper is punitively roused in order to awaken to make him change position and require him to perform specific tasks as part of the deconditioning process;

manually actuatable means for terminating said aversive stimuli, for an initial period of time, only while the manually actuatable means is actuated, and for terminating said aversive stimuli during a following period of time, without regard to the actuation or non-actuation of said manually actuatable means, as soon as the manually actuatable means has been continuously actuated for a period of time equal to said initial period of time;

whereby, in order to terminate said aversive stimuli, said sleeper must continuously actuate said manually actuatable means for said initial period of time, whereby said sleeper awakens fully while actuating said manually actuatable means.

3,998,210

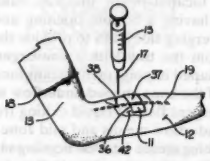
METHOD OF LOCATING VEIN

Elmo R. Nosari, Del Mar, Calif., assignor to Gate Industries, Inc., San Diego, Calif.

Filed July 30, 1974, Ser. No. 493,347

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 H **9 Claims**



6. A method of locating a vein of a patient for the purpose of taking a sample of blood from the patient or of infusing fluid into the vein of the patient by invasive techniques,

providing a thin temperature sensitive film having a substantially uniform thickness of a few mils and including a multiplicity of hollow microcapsules each having properties of passing light and each enclosing a chemical having properties of responding instantaneously to variations in temperature through a range of temperatures representative of temperatures on the skin of the patient to produce different colors in the chemical at such different positions in accordance with such variations in temperature at such different positions,

applying a solvent to a localized postion on the skin of the patient near the vein of the patient to sterilize and cool the skin at the localized position near the vein of the patient;

immediately thereafter disposing the thin temperature sensitive film on the skin of the patient at the localized position near the vein of the patient to obtain variations instantaneously and for only a relatively brief period of time in the color of the film at different positions in accordance with the variations in the temperature of the patient's body at such different positions; and

observing on the temperature sensitive film the positions which provide instantaneously and for only the relatively brief period of time the colors representative of the elevated temperature produced in the body of the patient by the proximity of the patient's vein.

3,998,211

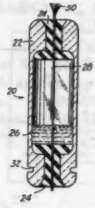
STRUCTURES FOR GROWING CULTURES WITHIN HUMAN AND ANIMAL BODIES

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Continuation-in-part of Ser. No. 499,925, Aug. 23, 1974, Pat. No. 3,934,575, and Ser. No. 499,926, Aug. 23, 1974, Pat. No. 3,924,607, each is a division of Ser. No. 329,862, Feb. 5, 1973, Pat. No. 3,842,166. This application Dec. 20, 1974, Ser. No. 534,893

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 F **14 Claims**



1. For use in connection with the growing of cultures in the interior of a cavity of a body of a human being or animal, enclosure means having a size and configuration suitable for occupying a position in a body cavity with one part of said enclosure means situated adjacent a location where the presence of one or more predetermined microorganisms is suspected and with said enclosure means being closed at least to an extent sufficient to prevent escape of fluids from the interior to the exterior of said enclosure means, nutrient means for growing a culture from a given microorganism, said nutrient means being situated in said enclosure means at another part thereof, and transfer means situated at said one part of said enclosure means for transferring a microorganism from the exterior to the interior of said enclosure means into contact with the nutrient means while said enclosure means remains closed to said extent sufficient to prevent escape of fluids from the interior to the exterior of said enclosure means.

3,998,212

ELECTRODE FOR PERCUTANEOUS POLAROGRAPHIC MEASUREMENTS

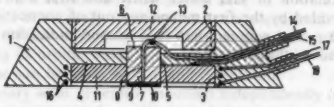
Helmut Reichenberger, Brand, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed May 30, 1975, Ser. No. 582,422

Claims priority, application Germany, June 28, 1974, 7422154[U]

Int. Cl.² A61B *5/00*

U.S. Cl. 128—2 E **9 Claims**



1. In a sensor for percutaneous polarographic measurements having anode and cathode electrodes, including a carrier portion for the electrodes; said carrier portion having a surface adapted to be applied to the skin of a patient and having a recess formed on said surface receiving said electrodes; a gas-permeable membrane mounted on said surface of said carrier portion an electrolyte located between said membrane and said cathode; and connector means for connecting said electrodes to a source of power supply and to a measuring unit, the improvement comprising: said membrane covering the application-facing end surface of only said cath-

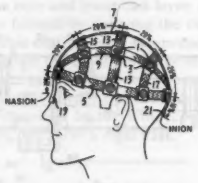
ode, said cathode being detachably mounted in said recess formed in said carrier portion, said cathode being isolated only by said membrane and electrolyte from the environment thereof, said anode having direct contact with the environment.

3,998,213

SELF-ADJUSTABLE HOLDER FOR AUTOMATICALLY POSITIONING ELECTROENCEPHALOGRAPHIC ELECTRODES

Robert A. Price, New York, N.Y., assignor to Bio-Volt Corporation, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,139
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 B 20 Claims



1. A self-adjustable holder for automatically positioning electroencephalographic electrodes on the head of an animal in accordance with the International 10/20 System, said holder comprising, in combination:

a. cap means for positioning on the head of an animal, said cap means being expandable and elastic so as to self-adjust to a snug fit when in place on the head, said cap means comprising a plurality of elongate members as follows:

1. a first member of generally circular shape of a size to surround the head in a substantially horizontal plane when said cap means is in place thereon;

2. a second member of generally semi-circular shape attached to said first member at first and second points on opposite sides thereof, said second member being of a size to extend over the top of the head in a substantially vertical plane when said cap means is in place thereon;

3. a third member of generally semi-circular shape attached to said first member at third and fourth points thereon, said third member being of a size to extend over the head substantially in a plane forming an angle with respect to said vertical plane of said second member; and

4. a fourth member of generally semi-circular shape attached to said first member at fifth and sixth points thereon, said fourth member being of a size to extend over the head substantially in a plane forming an angle with respect to said vertical plane of said second member,

said third and said fourth member being on opposite sides of said vertical plane; and

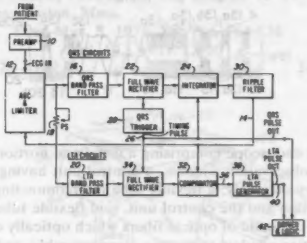
b. a plurality of electrode positioning means attached to said cap means for holding associated electrodes in contact with the head when said cap means is in place thereon, said electrode positioning means being located on said cap means relative to each other so as to hold said associated electrodes at precise positions in accordance with the International 10/20 System.

3,998,214

PREMATURE VENTRICULAR CONTRACTION DETECTOR AND METHOD

Lynn R. Garrison, Alsip, Ill., assignor to Brondy Laboratories, Inc., Palos Heights, Ill.

Filed May 19, 1975, Ser. No. 578,367
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 A 9 Claims



7. A system for detecting the occurrence of PVCs in an ECG wave, comprising

a first filter passing frequencies of about 10 Hz and above,

a second filter passing frequencies of about 6 Hz and below,

means coupling said ECG wave to said first and second filters,

first and second full-wave rectifiers respectively coupled to the outputs of said first and second filters,

gating pulse generating means responsive to an output from said first rectifier for providing a gating pulse of predetermined duration,

integrating means coupled to the output of said first rectifier and to which said gating pulse is applied for integrating the output from said first rectifier during the occurrence of said gating pulse, and

comparator means for comparing the voltage level of the outputs from said integrating means and from second rectifier to provide an output signal when one of said outputs exceeds the other by virtue of a PVC in the ECG wave.

3,998,215

BIO-MEDICAL ELECTRODE CONDUCTIVE GEL PADS

Clifford J. Anderson, St. Paul, and James T. Gumbusky, South St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

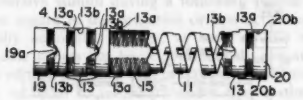
Continuation-in-part of Ser. No. 784,734, Dec. 18, 1968, abandoned. This application Apr. 23, 1971, Ser. No. 136,768
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 E 8 Claims

1. An electrically conductive pad conformable to the surface of the human body and adapted to facilitate the transfer of electrical signals between the body and an electrode, comprising a porous, fibrous carrier having a lightly adherent, conductive hydrogel carried thereby, said hydrogel impregnating and surfacing both sides of said carrier and said hydrogel being more cohesive to said hydrogel than adhesive to the surface of the human body to enable residue-free removal from the skin.

3,998,216
BENDING TUBE FOR ENDOSCOPE

Saburo Hosono, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1974, Ser. No. 511,249
Claims priority, application Japan, Oct. 4, 1973, 48-111756
Int. Cl.² A61B 1/06
U.S. Cl. 128—6 4 Claims

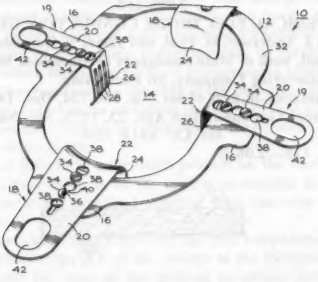


1. An endoscope comprising a distal end portion having an optical observation window, a control unit having an optical eye piece assembly; a flexible tube interconnecting the distal end portion and the control unit, said flexible tube internally housing a bundle of optical fibers which optically couples the observation window to the eye piece assembly; and a controllable bending tube interposed between the flexible tube and the distal end portion to enable bending of the distal end portion in at least a two-dimensional manner; said bending tube characterized by comprising an inner hollow cylindrical flexible braided structure capable of expanding and contracting and comprised of thin wires shown woven in crosswise pattern; said optical fiber bundle extending through said hollow braided structure; a flexible framework mounted concentric with and adjacent to the exterior surface of said braided structure and adapted to prevent the combined assembly of the braided structure and the flexible framework from being longitudinally compressed during bending and an outer plastic shell surrounding the exterior surface of said flexible framework.

3,998,217
SURGICAL RETRACTOR DEVICE

William Ernest Trumbull, Los Angeles, and James Joseph Cogley, Santa Monica, both of Calif., assignors to William E. Trumbull and James J. Cogley, both of Santa Monica, Calif., part interest to each

Filed Jan. 13, 1975, Ser. No. 540,323
Int. Cl.² A61B 17/02
U.S. Cl. 128—20 9 Claims



1. An improved surgical retractor device, said device consisting essentially of, in combination:

a. a surgical retractor frame defining an open central work portion with a plurality of retractor positions thereabout;

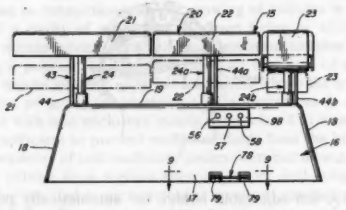
b. a plurality of surgical retractors, each retractor comprising an elongated arm with one end depending therefrom and adapted to engage the side of a surgical opening for retraction thereof; and

c. a plurality of connector means in the form of at least two spaced frame protrusions and three mating retractor openings per retractor position, the openings being shaped to define a retaining portion remote from the central work portion of the frame and a releasing portion adjacent said central work portion, each retractor being slidable between retaining and releasing positions of the openings relative to the corresponding protrusions to permit changing the operative position of the retractor relative to the central work portion.

3,998,218
CHIROPRACTIC TABLE

Kenneth G. Lane, Ava, and Emery J. Ropp, Seymour, both of Mo., assignors to Kenneth G. Lane, Ava, Mo.

Filed Aug. 6, 1975, Ser. No. 602,281
Int. Cl.² A61F 5/00
U.S. Cl. 128—70 9 Claims



1. A chiropractic table comprising:

a. a supporting base;

b. a table disposed above and supported by the said supporting base and adapted to support a patient thereon and including

1. a plurality of separately and individually movable table cushion sections arranged in generally parallel horizontal relationship relative to each other but adapted to be lowered vertically into and out of generally horizontal coplanar relationship with each other;

c. individual raising and lowering means for vertically raising and lowering each of the said table cushion sections separately and individually relative to the other table cushion sections;

d. a plurality of individual electrical power means for individually operating each of the said raising and lowering means;

e. individual power transmitting means for delivering power from each of the said individual electrical power means to each of the said raising and lowering means;

f. individual electrical power supply means for supplying electrical power to each of the said individual electrical power means;

g. individual electrical power control means for individually controlling the operation of the said electrical power supply means and the said individual electrical power means;

h. first motion limiting means for limiting the upward movement of each of the said raising and lowering means and the said table cushion section mounted thereon;

i. second motion-limiting means for limiting the downward movement of each of the said raising and lowering means and the said table cushion section mounted thereon; and

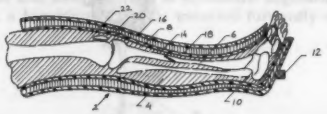
j. actuating means for actuating the said first motion-limiting means and the said second motion-limiting means at different elevations of each of the said table cushion sections.

3,998,219

ORTHOPEDIC SPLINT AND METHOD FOR FORMING SAME

James D. Mercer, Lafayette; Richard G. Kvalheim, Dublin, and Milton F. Custer, Livermore, all of Calif., assignors to Hexcel Corporation, Dublin, Calif.

Filed Dec. 5, 1975, Ser. No. 637,916
Int. Cl.² A61F 5/04
U.S. Cl. 128—89 R 32 Claims



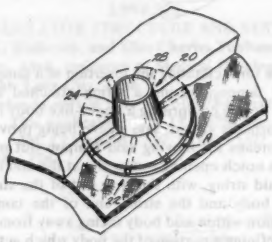
19. An orthopedic cast comprising an inner, relatively thin and substantially rigid cast layer placed over a body portion to be supported; an intermediate honeycomb core having cells disposed perpendicular to the skin of the body portion, a first indentable material placed over an outer face of the core; a second indentable material disposed in a space between an inner face of the core and inner cast layer; a substantially rigid outer cast layer formed by applying the outer cast layer over the first indentable material and compressing the first indentable material against the outer core face to thereby generate a compressive force between the outer cast layer and the inner cast layer and indent portions of the indentable material into corresponding openings of the honeycomb cells to thereby engage all layers and form a rigid cast.

3,998,220

CAST VENTING APPARATUS

Clarence W. Cleer, Jr., R.D. 2, Box 90, Kane, Pa. 16735, and Gerald M. Wilson, c/o Monticola Associates, Howardsville, Va. 24562

Continuation of Ser. No. 563,444, March 31, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 664,045
Int. Cl.² A61F 5/04
U.S. Cl. 128—91 R 9 Claims



1. A vent means for mounting within a wall of a surgical cast during installation thereof on a patient, said vent means comprising

a. a generally disc-shaped portion having two faces generally disposed in a common plane,

b. means defining a central bore in said disc-shaped portion extending generally perpendicular to the faces of said disc-shaped portion, said bore extending through one face of said disc-shaped portion,

c. means defining a plurality of generally radially extending air passageways in said disc-shaped portion, said passageways extending from the circumference of said disc-shaped portion to said central bore and being in fluid communication therewith, and

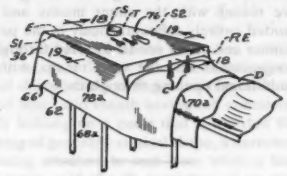
d. an upstanding portion extending from a face of said disc-shaped portion, said upstanding portion having a bore therein in fluid communication with said central bore of said disc-shaped portion, and said upstanding portion adapted to extend from the interior of a cast to the exterior thereof so that a vent is provided from the interior of a cast.

3,998,221

TABLE DRAPE ASSEMBLY AND METHOD

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Mar. 5, 1976, Ser. No. 664,136
Int. Cl.² A61F 13/00
U.S. Cl. 128—132 D 24 Claims



1. A drape assembly for a surgical equipment table comprising, first sterile sheet means of a material resistant to passage of bacteria and folded into said assembly, second and third sterile sheet means of a material resistant to passage of bacteria and resistant to abrasion and passage of liquid in at least a portion thereof, said second and third sheet means being folded into said assembly together with said first sheet means, said first sheet means being unfoldable from said assembly into a configuration over and depending below a reference edge of the table while the second and third sheet means remain in a folded configuration to provide a sterile barrier over the reference edge, said second sheet means being unfoldable from the assembly into a configuration covering a portion of the table and an edge of the table remote the reference edge while the third sheet means remains in a folded configuration to permit placement of sterile articles on the sterile second sheet means, said third sheet means being unfoldable from the assembly into a configuration over the first sheet means to provide a sterile barrier over the first sheet means.

3,998,222

SUBCUTANEOUS ARTERIO-VENOUS SHUNT WITH VALVE

Alfred A. Shihata, 2064 Baldwin, Jenison, Mich. 49464

Continuation-in-part of Ser. No. 460,789, April 15, 1974, abandoned. This application May 15, 1975, Ser. No. 577,933
Int. Cl.² A61M 5/00
U.S. Cl. 128—214 R 22 Claims

1. Subcutaneous arterio-venous valved shunt means for providing blood access in a patient through a hollow needle intermittently inserted through the skin of the patient, said valved shunt means comprising:

shunt means for shunting blood from an artery to a vein, said shunt means comprising a subcutaneous tubular member having one end adapted to be connected to an artery and another end adapted to be connected to a vein;

subcutaneous outlet means in the tubular member adapted to provide fluid communication between the interior and exterior of the shunt means;

subcutaneous mechanical valve means mounted in the outlet means and having a movable valve member that is movable between an open position, wherein the outlet means is open, and a closed position, wherein the outlet means is blocked, said valve means being adapted to engage and receive the inner end of the hollow needle when it is inserted through the skin, the engagement between the needle and the valve means providing a closed fluid-conducting conduit leading from the interior of the shunt means to the outer end of the hollow needle when the valve means is opened; and

actuation means for opening and closing the mechanical valve means with the shunt means and valve means mounted entirely subcutaneously in the patient and with the inner end of the needle inserted through the skin and in engagement with the valve means, without providing an additional opening through the skin.

3,998,223

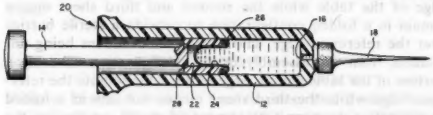
SYRINGE APPARATUS

Albert Rolke Dawe, Deerfield, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 24, 1975, Ser. No. 625,393

Int. Cl.² A61M *5/00*

U.S. Cl. 128—218 P 3 Claims



1. In a hand-held hypodermic syringe for the administration of a fluid, the syringe having a needle, a slideable plunger for applying a pressure to the fluid, and a barrel, the improvement comprising:

resilient means disposed within the slideable plunger for controlling pressure through the needle; and

venting means in the slideable plunger for permitting free movement of the resilient means.

3,998,224

DISPOSABLE SELF-DESTRUCTIBLE SYRINGES WHICH RENDER THEMSELVES UNREUSABLE

Marcelo Chiquiar-Arias, P.O. Box 11-385, Mexico City 11, Mexico

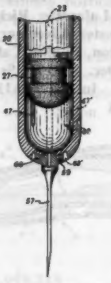
Division of Ser. No. 474,283, May 29, 1974, Pat. No. 3,951,146. This application Apr. 6, 1976, Ser. No. 674,263

Claims priority, application Mexico, Aug. 15, 1973, 145570

Int. Cl.² A61M *5/00*

U.S. Cl. 128—218 R 5 Claims

1. A disposable syringe which renders itself non-reusable which comprises a rigid cylinder coupled at one end to a bottom wall with an opening for the exit of the solution to be injected, and having the other end open, said end being integrally coupled to support flanges which extend outwardly and perpendicularly to the axis of the cylinder, and a plunger with a piston at the extreme end coupled to the cylinder, the piston having at least one punch rod which extends parallel to the longitudinal axis of the cylinder and is adapted to engage or



puncture the bottom wall of said cylinder so as to prevent reuse.

3,998,225

DEVICE FOR TAMPONS

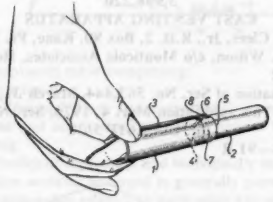
Valjo Nikodemus Hytonen, Helsinki, Finland, assignor to Salve S.A., Geneva, Switzerland

Filed May 14, 1975, Ser. No. 577,406

Claims priority, application Sweden, May 29, 1974, 7407073

Int. Cl.² A61F *16/00, 13/20*

U.S. Cl. 128—263 2 Claims



1. A device for facilitating the insertion of a tampon into the vagina, said tampon having a string attached at one end thereto, said device comprising a sleeve-like body in which the tampon is normally stored, said sleeve being provided at one end with a means for moving said tampon out of said body comprising a notch opening outwardly at the end of said body to receive said string, with the free end of the string located outside the body and the string end of the tampon in the storage position within said body facing away from said notch, said notch defining a portion of the body which acts as support or restraint for the tampon after the tampon has been partially moved out of the body by pulling said tampon strong a distance corresponding to the distance between said string end of the tampon and the bottom edge of the notch, so that the tampon is held or secured in this protruding position for insertion into the vagina.

3,998,226

INHALATION DEVICE FOR ENCAPSULATED CONCENTRATES

Arthur M. Harris, Miami Shores, Fla., assignor to Edward G. Gomez, Coral Gables, Fla.

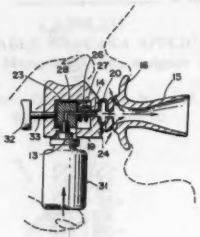
Filed Sept. 22, 1975, Ser. No. 615,420

Int. Cl.² A61M *15/02, 13/00*

U.S. Cl. 128—266 3 Claims

1. An inhalation device for encapsulated concentrates com-

prising a body member having a chamber having a front and rear wall, a block member slidably mounted in said chamber from a first position to a second position, spring means yieldingly urging said block member to said first position rearwardly in said chamber, a mouthpiece mounted on the front wall of said body member, said mouthpiece having a passageway extending longitudinally thereof, a duct in said front wall extending from said chamber to said passageway, an open cavity for receiving a capsule formed in said mouthpiece adjacent to said front wall and in substantial alignment with said duct, a hyperdermic needle mounted forwardly of said



slide block in axial alignment with said duct and extending beyond said cavity when said block is in said second position, means for sliding said block member to said second position forwardly in said chamber whereby said needle slides substantially beyond said cavity and is adapted to form aligned openings in a capsule positioned in said cavity, and an inlet duct for receiving an aerosol bottle communicating with said hyperdermic needle whereby fluid under pressure from said aerosol bottle passes through said ducts and said aligned openings to disperse the granules contained in said capsule into said passageway and be discharged through said mouthpiece.

3,998,227

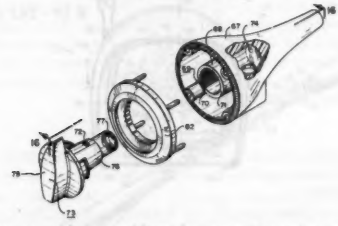
REGULATOR STRUCTURE AND SYSTEM

LeGrand K. Holbrook, and Silas Charles Topham, both of Salt Lake City, Utah, assignors to Medical Development Corporation, Salt Lake City, Utah

Continuation-in-part of Ser. No. 505,784, Sept. 13, 1974, abandoned. This application July 23, 1975, Ser. No. 598,374

Int. Cl.² A61M *1/00;* **F16K** *11/02*

U.S. Cl. 128—276 **30 Claims**



1. A regulator device for vacuum systems including, in combination, a base housing having an air outlet, means mounted to and cooperable with said base housing for providing a variable, atmospheric air inlet to said base housing, said base housing having an air passageway means between said air outlet and said air inlet of a transverse open cross-sectional area not greater than .002 square inches.

3,998,228

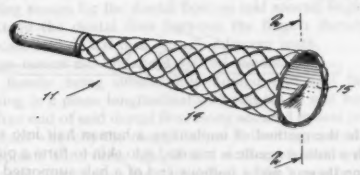
EXTERNAL CATHETERIZE DEVICE FOR MALES

Vincent Poidomani, 2448 E. First St., Brooklyn, N.Y. 11223

Filed Oct. 14, 1975, Ser. No. 621,645

Int. Cl.² A61F *5/44*

U.S. Cl. 128—295 **1 Claim**



1. An external catheterize device for males, comprising in combination, a sheath, a flexible hose attachable at one end to one end of said sheath, and a container connected to an opposite end of said hose; said sheath having self contained means for frictionally holding on a penis that is inserted thereinto; said sheath being of generally conical shape, a narrower end of said sheath being attached to said hose while a larger end receives said penis, said sheath consisting of an outer case made of a plurality of crossing interwoven, flexible, right and left spiral shaped, flat strips forming a basket weave that runs diagonally respective to a longitudinal axis of said sheath, said sheath accordingly being enlarged in diameter when longitudinally contracted so to receive said penis, and being diametrically contracted when longitudinally stretched so to bind on said penis, a flexible, thin, waterproof plastic liner of conical shape on an inner side of said case, said sheath having a length that is ten times the diameter of said larger end, and said narrower end having a diameter that is one-half said larger end; a rigid nipple being secured at said narrower end of said sheath, said nipple having a central opening therethrough, an external thread around one end of said nipple engaging a threaded end-cap when said hose is not connected to said nipple, an opposite end of said nipple having a row of annular teeth for firmly grasping said hose end, and said container including a removable lid to which said hose opposite end is affixed, said container cover having an air vent.

3,998,229

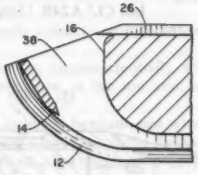
SURGICAL MARGIN BLADE

Richard T. Barton, 658 Nimes Road, Los Angeles, Calif. 90024

Continuation-in-part of Ser. No. 524,066, Nov. 15, 1974, abandoned. This application July 22, 1975, Ser. No. 597,996

Int. Cl.² A61B *17/32*

U.S. Cl. 128—305 **6 Claims**

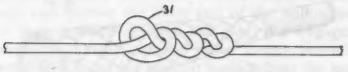


1. A surgical knife comprising:

an elongated handle having blade holding means at one end thereof;

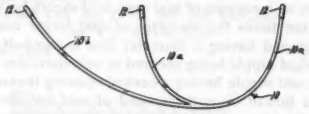
blade means secured to said blade holding means, said blade means having laterally spaced elongated slicing blade portions extending endwise from said handle and a transverse trenching blade portion spanning the space between said slicing blade portions adjacent the outer ends thereof and all of said blade portions having cutting edges facing the same direction lateral to the length of said handle.

3,998,230
HAIR TRANSPLANT PROCESS
Paul W. Miller, Atlanta, Ga., assignor to Hairegenics, Inc., Atlanta, Ga.
Filed Oct. 22, 1974, Ser. No. 516,887
Int. Cl.² A61B 17/34; A61F 1/00
U.S. Cl. 128—330 6 Claims



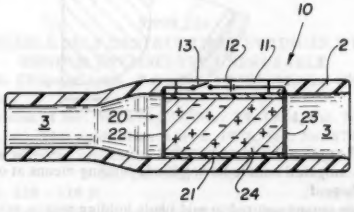
6. In the method of implanting a human hair into skin by which a hollow needle is inserted into skin to form a pit in the surface thereof and a bulbous end of a hair supported within the hollow needle is positioned within the skin pit, the improvement comprising forming the bulbous end on the human hair end prior to implantation by tying the human hair end into a loop with a spacial interstice through which skin tissue may subsequently grow and thereby tenaciously anchor the hair.

3,998,231
BACKLESS BRASSIERE
Victoria Delet, 38 Peacock Dr., Roslyn, N.Y. 11576
Filed Aug. 22, 1975, Ser. No. 606,879
Int. Cl.² A41C 1/20
U.S. Cl. 128—476 5 Claims



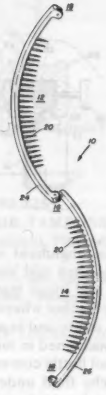
1. A brassiere comprising a pair of bust cups, said bust cups being secured together adjacent their inner edge, a semi-rigid U-shaped underwire section secured along the lower portion of each of said bust cups and having an arcuate extension extending outwardly from the lower portion thereof, and strap means secured between a point adjacent the end of each said arcuate extension away from said bust cup and said bust cup so that, in use, said arcuate extension extends under the wearer's arm to provide support for the bust.

3,998,232
FILTERING TOBACCO SMOKE
Avery B. Smith, 36 Surrey Drive, Wallingford, Conn. 06492
Filed Oct. 31, 1974, Ser. No. 519,528
Int. Cl.² A24B 15/02
U.S. Cl. 131—262 B 7 Claims



1. In an apparatus for filtering tobacco smoke, and having a source of electrical power; a tobacco smoke filter cartridge comprising:
a wrapper of an electrically insulating material, the wrapper defining a filter chamber,
a bed of particles of material packed into the filter chamber, the material having conductivity at least equal to the conductivity of a semiconductor, and
two spaced electrodes, in electrical contact with the bed of particles, mounted for connection to the power source.

3,998,233
BARRETTE WITH SWIVELED HINGE
Irene M. Dorr, 3819 Arbutus Ave., Baltimore, Md. 21207
Filed Sept. 22, 1975, Ser. No. 615,525
Int. Cl.² A45D 8/24
U.S. Cl. 132—48 A 5 Claims



1. A barrette comprising:
oppositely disposed rib-like members;
means releasably joining the members at the ends of the members; and,
swivel means hingably joining the members at the opposite ends thereof from the first-mentioned means.

3,998,234
ANIMATABLE MUSICAL TOOTHBRUSH HOLDER
Albert Stubbmann, 746 Dakota Trail, Franklin Lakes, N.J. 07417
Filed July 31, 1975, Ser. No. 600,284
Int. Cl.² A45D 44/18
U.S. Cl. 132—84 R 13 Claims

1. An animatable musical toothbrush holder comprising:
a. a housing;
b. a musical movement having stationary and movable components within said housing;
c. a stationary representation of a character associated with said housing;
d. a movable representation in association with said stationary representation, said movable and said stationary rep-

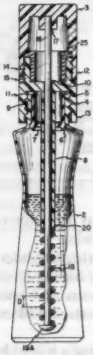
resentations constituting different portions of an animatable display;
e. means for operably coupling said movable components of said musical movement and said movable representation so that said animatable display is animated while said musical movement operates;
f. at least one holding means in association with said housing adapted for supporting at least one toothbrush; and
g. control means for selectively starting and stopping said musical movement, said control means being independent of the positioning of a toothbrush within said holding means.

3,998,235

ADJUSTABLE MASCARA APPLICATOR

Ted I. Kingsford, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.

Filed Nov. 24, 1975, Ser. No. 634,703
Int. Cl.² A45D *40/30*
U.S. Cl. 132—88.5 **19 Claims**



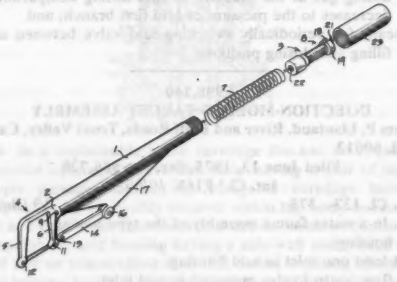
1. An eyelash cosmetic applicator comprising:
a. a shaft,
b. handle means attached to one end of said shaft,
c. a helical spring applicator head aligned with the axis of said shaft and encircling the other end of said shaft, and
d. means for setting the axial distance of adjacent turns of said spring between 0–3.2 mm.

3,998,236

DENTAL FLOSS MANIPULATOR

Bonny B. Koo, 1016 Austin Ave., Pacific Grove, Calif. 93950

Filed Aug. 15, 1975, Ser. No. 605,028
Int. Cl.² A61C *15/00*
U.S. Cl. 132—92 R **7 Claims**



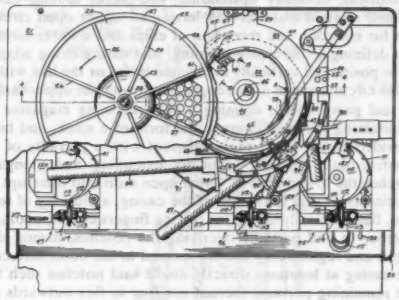
1. In a dental floss manipulator,
a handle,
fingers at one end of the handle spaced from one another so as to straddle teeth in the mouth,
anchor means on said handle to anchor unwound dental floss,
resilient means on said handle urging said anchor means toward the other end of said handle,
guiding means for the dental floss on said spaced fingers to extend the dental floss between the fingers thereby to locate said dental floss betwen adjacent teeth,
trigger means movably held on said handle,
said handle being substantially tubular and said fingers being in a plane longitudinal with respect to said handle,
the free end of said dental floss being secured to said trigger means whereby the manipulation of the trigger means in opposite directions against the action of said resilient means reciprocates the dental floss in the space between the teeth in the mouth.

3,998,237

COIN SORTER

John A. Kressin; Charles T. Bergman, and Arnold R. Buchholz, all of Watertown, Wis., assignors to Brandt, Inc., Watertown, Wis.

Filed Apr. 25, 1975, Ser. No. 571,860
Int. Cl.² G07D *3/00*
U.S. Cl. 133—3 A **6 Claims**



1. In a coin sorting apparatus, the combination comprising:
sorting means including a rotating disc and means for removing coins by denomination from the circumference of said disc at spaced positions along said circumference;
discharge chutes for different denominations of coins with each chute leading from a respective one of the positions along said circumference to a collecting station for one denomination; and
feed means to supply coins to said disc, said feed means comprising
a rotary wheel having circumferentially spaced pockets therein which are open at the top and bottom of said wheel,
a stationary floor disposed beneath said wheel and having an opening which conforms to the bottom opening of each of said pockets, said opening being disposed above said disc,
a feed motor drivingly connected to said wheel to rotate said wheel so that the contents of a pocket will fall through said opening and be deposited on said disc, and
circuit means for connecting said feed motor to a source of power, said circuit means including manually selectable means for causing said circuit to be closed to have said motor rotate said wheel through an arc sufficient to advance only one pocket over said opening and alternately for causing said circuit to be closed to have said feed motor continuously rotate said wheel.

3,998,238

CHIP-DISPENSING DEVICE

George A. Nigro, Chicago, Ill., assignor to Rodney L. Griffin, Chicago, Ill., a part interest

Continuation of Ser. No. 466,002, May 1, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,277

Int. Cl.[2] G07D 1/00

U.S. Cl. 133—5 A 3 Claims

1. As a new article of manufacture, a device for dispensing chips or the like one at a time and comprising an elongated, cylindrical, normally upstanding, one-piece, tubular casing formed of rigid material and having an upper open circular rim for insertion and reception of chips and a lower circular rim defining a dispensing opening, said casing being adapted to be positioned vertically on a game board or the like with its lower circular rim in direct engagement with the upper surface of said game board, defining a chip-receiving magazine for maintaining received chips in the form of a stack, and being provided in the lower region thereof with a plurality of circumferentially spaced, vertically extending and elongated notches the lower ends of which open onto and interrupt the continuity of said lower rim of the casing, a plurality of separate, flat, vertically elongated, spring fingers corresponding in number to and partially overlying the notches, having their upper end regions only fixedly secured to the outer surface of the casing at locations directly above said notches such that the remaining portions thereof are free to flex outwards and inwards in an arc, and having the lower end regions thereof bent inwards only so that they project inwardly and downwardly at an angle of approximately 45°, extend through the lower portions of the notches and into the space within the lower circular rim of the casing, and serve to retain the stack of chips in supported relationship and also to engage with a camming action the lowermost chip in the stack, the upper end regions of the spring fingers being positioned at all times directly outwards of the outer periphery of the casing, the lower end edges of the inwardly bent lower end regions of said spring fingers being straight, having the length thereof the same as the width of the spring fingers, and terminating above said lower circular rim of the casing a distance substantially equal to the thickness of a chip, a plunger normally positioned within and slidable vertically in the casing, said plunger being removable through the upper circular rim of the casing in order to permit a stack of chips to be inserted into the magazine, said plunger when normally positioned in the casing having its lower end in engagement with the uppermost chip in the stack, and when forced downwards applying downward pressure to the stack in order to force the lowermost chip into camming engagement with the inwardly bent lower end regions of the spring fingers and thus causing the central and lower end regions of said fingers to flex outwards and allow passage of said lowermost chip only downwardly and onto said game board, and means connected to the plunger and disposed for the most part exteriorly of the casing for use in manually forcing the plunger downwards for chip-dispensing purposes.

3,998,239

GAS DOSING ARRANGEMENT

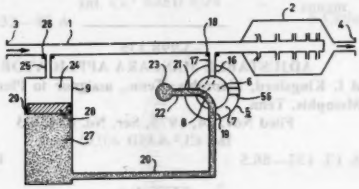
Johan Christiaan Willem Kruishoop, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

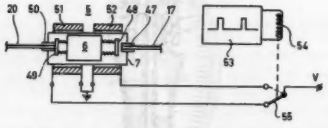
Filed May 30, 1974, Ser. No. 474,809

Claims priority, application Netherlands, June 1, 1973, 7307629

Int. Cl.[2] G05D 11/035

U.S. Cl. 137—101.11 15 Claims





1. Gas dosing apparatus for metering a dose gas into a carrier gas stream, comprising:

a flow line for connecting an inlet for carrier gas to an outlet, said flow line having first and second branches respectively downstream and upstream relative to each other and means downstream of said branches for homogenizing a gas stream;

a gas storage vessel having a movable gas-tight wall dividing said storage vessel into a first compartment connected to said second branch and a second compartment for holding dose gas;

means for maintaining a pressure difference between dose gas held in said second compartment and carrier gas at said first branch;

a gas metering valve having a dosing compartment associated therewith, said valve being periodically switchable between a filling position in which said dosing compartment is in open communication with only said second compartment receiving therefrom each time a fixed amount of dosing gas as the pressure in said dosing compartment increases to the pressure of said second compartment and a dosing position in which said dosing compartment is in open communication with only said first branch releasing thereto each time said fixed amount of dosing gas as the pressure in said dosing compartment decreases to the pressure of said first branch; and

means for periodically switching said valve between said filling and dosing positions.

3,998,240

INJECTION-MOLDED FAUCET ASSEMBLY

James P. Liautaud, River and Bluff Roads, Trout Valley, Cary, Ill. 60013

Filed June 13, 1975, Ser. No. 586,720

Int. Cl.[2] F16K 19/00

U.S. Cl. 137—375 15 Claims

1. In a water faucet assembly of the type having

a housing;

at least one inlet in said housing;

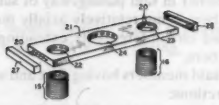
a flow control valve mounted in said inlet;

an outlet in said housing; and

means for coupling an inlet pipe to said inlet;

the improvement wherein

said housing is made of molded plastic and said inlet and said outlet are defined therein, and wherein liquid communication is established between said inlet and said



outlet by means of an elongated core member embedded in said housing, said core member having a plurality of longitudinally extending passageways therethrough positioned between and in fluid communication with said inlet and said outlet.

3,998,241

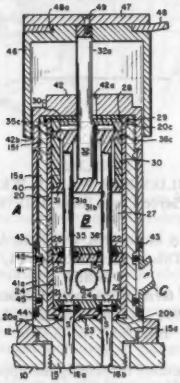
SINGLE CONTROL FAUCET

Lloyd K. Jones, and David A. Yanov, both of Morgantown, W. Va., assignors to Elk Manufacturing Company, Inc., Morgantown, W. Va.

Filed Feb. 6, 1976, Ser. No. 655,640

Int. Cl.² F16K *11/14*

U.S. Cl. 137—454.6 **13 Claims**



1. In a replaceable valve cartridge for use in a fixture-mounted open-end sleeve-like body having a pair of liquid supply passages therein, an elongated cartridge housing adapted to be removably secured within the body to receive hot and cold water therefrom and deliver water of controlled temperature, said housing having a side wall and a back end wall and an intermediate wall that define a mixing chamber, said housing having a front end wall that defines an operating chamber with said side and intermediate walls, said back end wall having a pair of valve seating passages extending therethrough into said mixing chamber and adapted to align with the supply passages in the body to receive hot and cold water therefrom, a pair of pin-like valve elements operatively positioned in said housing to extend backwardly into cooperating opening and closing positions with respect to said valve seating passages for controlling flow of water into said mixing chamber, said pair of valve elements extending forwardly in an endwise-slidable relation through said intermediate wall into said operating chamber, a hollow cylindrical cam positioned for endwise back and forth and for rotative movement within said operating chamber, said cam having a back end portion through which forward end portions of said valve elements extend in a guided relation into and along the interior of said cam, said cam having a guide slot part for each of said valve elements in its side wall, each of said valve elements having an operating lug extending transversely from its forward end portion into a cooperative guided relation within an associated one of said guide slot parts, an operating stem extending forwardly from said cam for rotating said cam to advance said slot parts with respect to said lugs for adjusting the relative longitudinal positions of said valve elements with respect to each other and with respect to said seating passages, and said stem being adapted to move said cam longitudinally for moving said valve elements with respect to the associated seating passage.

3,998,242

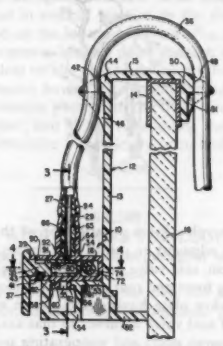
PLASTIC GANG VALVE ASSEMBLY

Marvin A. Goldman, Great Neck, and Jerome N. Goldman, New York, both of N.Y., assignors to Penn-Plax Plastics, Inc., Garden City, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,337

Int. Cl.² A01K *64/02*

U.S. Cl. 137—608 **6 Claims**



1. A gang valve assembly comprised entirely of a resin material, said assembly comprising

a. a plurality of identical connected-together valve bodies, each with an integral portion defining an elongated assembly having a longitudinally extending main distribution bore therethrough;

b. a first orifice in each said valve body and spaced along said assembly, with each first orifice communicating with said main distribution bore;

c. a plurality of integral first extensions on each said valve body, each of said first extensions defining a cylindrical valve receiving cavity surrounding one of said first orifices;

d. a plurality of cylindrical valves with one each rotatably disposed in each of said first extension cavities;

e. each of said valves having an axial bore communicating with its respective first orifice;

f. each of said valves having a radial orifice communicating with its respective axial bore;

g. each of said first extensions having a second orifice;

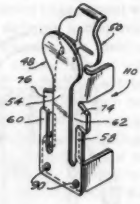
h. each of said first extensions having an integral second extension around said second orifice defining an outlet for each of said valve body extensions whereby rotating of one of said valves in its respective first extension brings selectively said valve body orifice into and out of communication with its respective second orifice;
i. a plurality of elongated plugs with one each inserted into one end of said main body distribution bore and the cavities defined by said second extensions;
j. each of said plugs having a longitudinally extending bore and at least one annular groove;
k. each of said plugs having a radial bore communicating between its longitudinal bore and its respective annular groove; and
l. each of said plugs having a first portion with a cross sectional configuration for frictionally engaging selectively one end of said main body distribution bore and the cavities defined by said second extensions.

3,998,243

FLAPPER VALVE FOR A ROTARY COMPRESSOR

Charles L. Osterkorn, N. Brunswick, and Milton M. Kosfeld, Coltsneck, both of N.J., assignors to Fedders Corporation, Edison, N.J.

Filed Nov. 19, 1975, Ser. No. 633,406
Int. Cl.² F16K *15/16*
U.S. Cl. 137—856 8 Claims



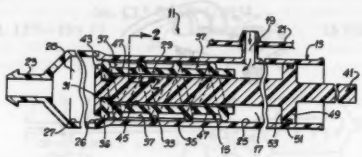
1. A flapper valve for a compressor of the type having a valve chamber adjacent an outlet port for receiving said flapper valve therein; said valve comprising a flexible planar valve member having front and rear ends, a port closure at the front end; and a backer plate having one end in engagement with the rear end of said valve member to bias said port closure to close the discharge port; and cooperating positioning means on said valve member and said backer plate for retaining said valve member in position, said positioning means comprising a pair of laterally spaced arms on said valve member extending forwardly from the rear end thereof, and a pair of upturned ears on said backer plate sized and positioned to engage the forward edges of said respective arms to prevent lateral and longitudinal movement of said valve member; said backer plate comprising first projection means at said one end of said backer plate extending in a direction away from said valve member for engaging a wall defining the valve chamber, said first projection means being sized to force said rear end of said valve means against the opposite wall of the valve chamber, and second projection means intermediate the ends of said backer plate extending in a direction away from said valve member for engaging the same chamber wall as said first projection means for positioning said backer plate in said valve chamber; said backer plate having a surface facing said valve member, said surface being curved in a direction away from said valve member from the rear to the front of said backer plate so that the portion of said backer plate opposite said port closure is spaced therefrom.

3,998,244

DRIP IRRIGATION VALVE WITH HELICAL FLOW PATH

Clarence Bentley, 9256 Stamps Ave., Downey, Calif. 90240

Filed Aug. 8, 1975, Ser. No. 603,142
Int. Cl.² F15D *1/02*
U.S. Cl. 138—43 33 Claims



1. A drip irrigation valve comprising:
an outer member having a passageway;
an inner member in said passageway of said outer member, said members being relatively axially movable;
an axially and circumferentially extending rib on a first of said members;
a second of said members having first and second peripheral surface sections;
said rib being engageable with the first peripheral surface section to the extent that said rib substantially radially confronts said first peripheral surface section to define a flow passage, said members being positionable so that the flow passage has a plurality of turns with each of said turns extending at least part way around the inner member;
means for admitting fluid under pressure to one end of the flow passage whereby the fluid can flow through the flow passage and be discharged at the other end of the flow passage; and
said rib being out of engagement with the second peripheral surface section whereby the flow passage terminates at the second peripheral surface section and the length of the flow passage and the flow rate through said flow passage can be varied by relatively axially moving the members to change the axial position of said rib relative to said first and second peripheral surface sections.

3,998,245

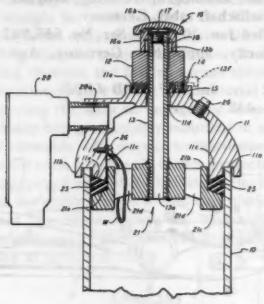
SEAL ASSEMBLIES FOR WATER WELL CASINGS

Carlyle J. Martin, Pierce Creek Road, R.D. No. 1, Binghamton, N.Y. 13903

Continuation-in-part of Ser. No. 493,526, Aug. 1, 1974, Pat. No. 3,917,292. This application July 14, 1975, Ser. No. 595,851
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.² F16L *55/10*
U.S. Cl. 138—89 9 Claims

1. A well seal assembly for sealing the upper end of a hollow cylindrical well casing, comprising, in combination: a cap having an annular first flange adapted to extend into said casing adjacent the inner wall of said casing and a bore extending through said cap substantially along the cylindrical axis of said casing; shaft means extending through said bore of said cap means; a lower flange adapted to be situated within said casing and be supported by said shaft means, said lower flange means having an annular surface; a compressible seal ring situated between said first flange and said surface of said lower flange means; and tightening means engaging a portion of shaft means above said bore for raising said shaft means and

said lower flange means relative to said cap means to compress said compressible seal ring between said first flange and



said lower flange means, causing radial expansion of said seal ring against said inner wall of said casing.

3,998,246

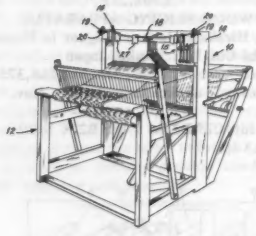
MEANS FOR KEEPING TRACK IN WEAVING OPERATIONS

Penelope Strousser, 4532 Gibson, St. Louis, Mo. 63110

Filed Feb. 24, 1975, Ser. No. 552,721

Int. Cl.² D03D *29/00*; D03J *1/10*; G09B *19/20*; G09C *1/00*

U.S. Cl. 139—1 R 14 Claims



1. In a weaving device such as a loom having a frame and means on the frame for mounting a plurality of treadling levers different combinations of the settings of which may be made depending upon a weaving operation to be performed, the improvement comprising means whereby an operator can determine step-by-step each operation he has to perform in a desired weaving operation so he can weave a desired pattern in a proper sequence and keep track of where he is in a weaving process, said means including an elongated guide member having opposite ends and means for attaching the opposite ends to spaced locations on the loom so that the guide member is at an easily accessible location, and a plurality of instruction cards mounted for movement along said guide member, movement of said cards being independent of other functions of the weaving device, each of said cards having an instruction formed thereon which advises the operator as to each particular step to be performed in the weaving process, said cards being movable along the guide member as the step to be performed that is indicated thereon is completed, said guide member being formed to enable accumulating a plurality of said cards adjacent opposite ends thereof.

3,998,247

DEVICE FOR COMPENSATING THE LENGTH OF BINDING THREADS IN A ROTARY SHEDDING DEVICE

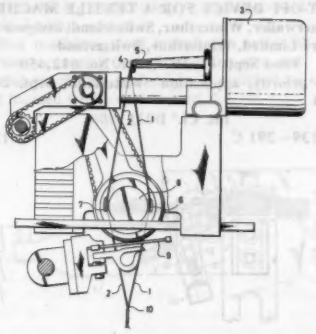
Stanislav Kovar, Vsetin, Czechoslovakia, assignor to Zbrojovka Vsetin, narodni podnik, Vsetin, Czechoslovakia

Filed Apr. 9, 1975, Ser. No. 566,411

Claims priority, application Czechoslovakia, Apr. 11, 1974, 2606-74

Int. Cl.² D03C *11/00*

U.S. Cl. 139—54 2 Claims



1. In an apparatus for forming a leno-type selvedge at a fixed binding point of a weaving loom, a shed-forming twisting disc having a fixed axis extending parallel to the direction of weft insertion in the loom, the disc exhibiting a pair of diametrically opposed elongated arcuate slots extending axially therethrough and in coaxial relation to the disc axis, strand means supported on the loom for paying off a pair of binding threads to the common binding point through individual ones of the arcuate slots on the disc to define a selvedge shed, the strand supply means having a common thread exit aperture disposed in a common plane with the fixed binding point and the axis of the disc, and means for rotating the disc about its axis in a fixed direction to cyclically open and close the selvedge shed.

3,998,248

WEFT BAND WITH CARRIER FOR LOOPER LOOMS

Erwin Weidmann, Ruti, Switzerland, assignor to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed Nov. 25, 1974, Ser. No. 527,171

Claims priority, application Switzerland, Dec. 4, 1973, 16993/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² D03D *47/18*

U.S. Cl. 139—449 7 Claims

1. A weft band attached at one end thereof with a yarn carrier having a connecting area therebetween, said weft band and connected yarn carrier used for inserting weft threads into

sheds during the operation of a loom, said weft band having a first section defining a vibration zone adjacent to said connecting area separated by a relatively small distance from the rear end of said carrier and a second section bordering on said first section, said weft band having a reduction in material in said first section in relation to said second section to produce a substantial decrease in the stress in said connecting area when said weft band and yarn carrier are in operation.

3,998,249

CUT-OFF DEVICE FOR A TEXTILE MACHINE

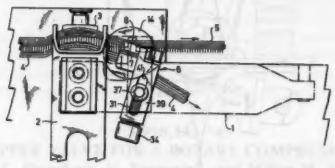
Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sept. 11, 1975, Ser. No. 612,450

Claims priority, application Switzerland, Sept. 20, 1974, 12788/74

Int. Cl.² D03J *1/08*

U.S. Cl. 139—291 C 15 Claims



1. A cut-off device for a textile machine comprising

a cutter including at least one movable member; and

a drive for moving said movable member, said drive including a lever, a freely rotatable disc having a flat surface facing said lever and a drive element for producing a reciprocating movement, one of said lever and said disc being connected to said movable member and the other of said lever and said disc being connected to said drive element for reciprocation thereby.

3,998,250

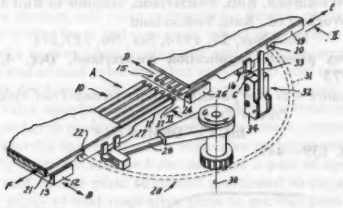
HEDDLE TRANSFER STOP MOTION IN A TRIAXIAL WEAVING MACHINE

Franklin L. Townsend, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed May 3, 1976, Ser. No. 682,774

Int. Cl.² D03D *51/18*

U.S. Cl. 139—336 15 Claims



1. In a weaving machine wherein a heddle is transferred laterally to a trailing end of a weftwise row of laterally shifting heddles and then moved longitudinally in a fixed path to position a warp strand guided thereby at a predetermined location in a warp shed, apparatus for detecting improper positioning of said heddle at the trailing end of said row of heddles, said apparatus comprising a fixed passageway at the trailing end for receiving and guiding longitudinal movement of said heddle into an extended heddle shedding position, transfer means for moving the heddle laterally into alignment with said passageway, and a detector for sensing a predetermined lateral position of said heddle at which the heddle is in substantial alignment with said passageway.

3,998,251

CLAMPING DEVICE AT GRIPPER HEADS FOR SHUTTLELESS LOOMS

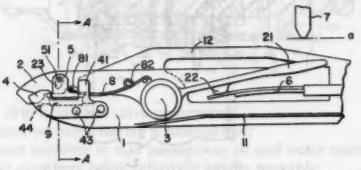
Wilhelm Hadam, Reutlingen, Germany, assignor to Lindauer Dornier Gesellschaft mbH, Germany

Filed Jan. 20, 1976, Ser. No. 650,802

Claims priority, application Germany, Apr. 17, 1975, 2517011

Int. Cl.² D03D *47/20*

U.S. Cl. 139—448 9 Claims



1. In a clamping device adapted for use at a gripper head for a shuttless loom, in which a gripper head pulls a weft thread out of the shed while held between two clamping jaws by a clamping lever of a clamping device subject to spring action while a control means acts upon said clamping lever provided with a clamping jaw,

the improvement which comprises means whereby one of said clamping jaws is movable at a part carrying it and is springingly, yieldingly positioned in the opening direction of the clamping device, in a limited manner,

and said control means operates in a two-stage manner such that the first actuating stage is within the limits of movability of said movable clamping jaw, and the second actuating stage lifts the clamping jaws off of each other.

3,998,252

WOOD SLICING APPARATUS

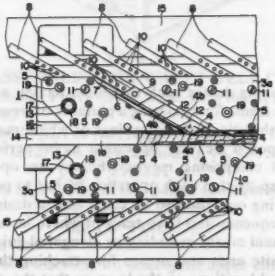
Osamu Senba, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 15, 1975, Ser. No. 568,375

Claims priority, application Japan, Nov. 20, 1974, 49-134101

Int. Cl.² B27M *1/08;* B27C *9/00*

U.S. Cl. 144—3 R 8 Claims



1. A wood slicing apparatus comprising a cutting unit, driving means coupled to said cutting unit for driving said cutting unit in a rectilinear motion along a line entering a board-shaped base material from which portions are to be severed, and a support member for holding said board-shaped base material thereon, said cutting unit including at least one set of blade holding elements spaced from and opposed to each other at a predetermined spacing for accommodating said board-shaped base material therebetween and having a plural-

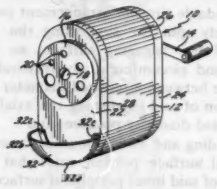
ity of blade accommodating grooves therein, and a plurality of thin cutter blades in said grooves in said blade holding elements and each blade projecting from the opposed surfaces of said blade holding elements and the blades in each element being in a straight line with blades in one line being opposed to the blades in the other line, successive thin blades in each blade holding element projecting further toward the other blade holding element, the driving means moving the cutting unit in a direction relative to the base material for causing the blades projecting the least to engage the base material first, said thin blades being adjustably mounted in said grooves in said holder elements with respect to the distance said blades project toward each other, said blades projecting toward the opposed surfaces of said blade holding elements at an angle thereto with the cutting edges of said thin blades being on the edges of said thin blades facing the opposed blade holding element and the end of each thin blade and the cutting edge thereof being at an obtuse angle.

3,998,253

LEAD-PENCIL SHARPENER

Richard A. Kerr, Jr., 1714 Heritage Ave., Placentia, Calif. 92670

Filed Aug. 20, 1975, Ser. No. 606,074
Int. Cl.² B43L *23/04*
U.S. Cl. 144—28.1 **3 Claims**



1. For use with a lead-pencil sharpener having a horizontally operable shaving mechanism, a housing about said mechanism for collecting lead and wood shavings from said mechanism and formed with at least one opening through which a lead-pencil may be inserted, the combination of

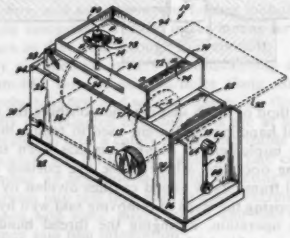
a generally cup-shaped ledge member formed with a generally horizontal bottom wall, generally vertical front and side walls and a mounting tab, said tab being attached to said housing to cause the latter to form a rear wall for said ledge member to thereby provide continuous vertical walls for retaining said shavings.

3,998,254

SAFE POWER MACHINE

Marius Joseph Morin, Torrance, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Mar. 3, 1975, Ser. No. 554,844
Int. Cl.² B27C *9/04*; B27G *19/02*; F16P *1/02*
U.S. Cl. 144—35 R **5 Claims**



1. A safe power machine comprising:

a housing with walls forming a first slot having a thickness of no more than about three-eights inch at the surface of the housing to prevent the deep entrance of a human finger therein, said first slot extending substantially horizontally, said housing having a second slot substantially parallel to and vertically spaced from said first slot, a portion of one of said slots lying directly over the other slot and said slots extending into said housing from opposite sides of the housing;

a motor mounted in said housing;

a first machining tool drivingly coupled to said motor and located within said slot,

said first machining tool including a saw with an upper portion extending through said first slot; and

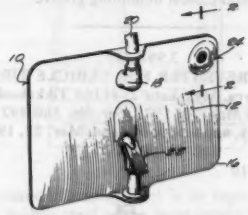
a second machining tool drivingly coupled to said motor and located within said second slot.

3,998,255

BREATHER ASSEMBLY FOR A SEALED CONTAINER

Byron L. Mather, Milwaukee, and Raymond H. Johnston, Greenfield, both of Wis., assignors to Plastronics, Inc., Milwaukee, Wis.

Filed Sept. 17, 1975, Ser. No. 614,135
Int. Cl.² B65D *33/00*
U.S. Cl. 150—1 **6 Claims**



1. A breather assembly for a sealed container having a breather opening therein and said container being made of non-porous plastic material having the characteristics of receiving an electronic weld:

a breather element adapted to permit free passage of gas therethrough and to resist passage of liquid therethrough, said breather element comprising a woven substrate of synthetic material with a coating of plastic material, said plastic material having the characteristics of receiving an electronic weld;

a breather element retaining ring having an opening in the central portion thereof, said retaining ring being made from a non-porous plastic material having the characteristics of receiving an electronic weld; and

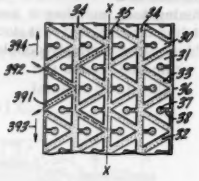
said retaining ring mounted on the wall of the container with the opening therein in substantial alignment with the breather opening in the wall of the container, said breather element mounted between said ring and said wall with the retaining ring overlying said breather element, said retaining ring being fused by electronic welding to said wall and said element to thereby seal the parts together and prevent any tendency of liquid in the container to flow around the edge of the breather element.

3,998,256

TIRE WITH TREAD BLOCKS HAVING IDENTICAL, CIRCULAR ELLIPSES OF INERTIA

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand (Puy-de-Dome), France

Filed June 27, 1974, Ser. No. 483,643
Claims priority, application France, July 5, 1973, 73.25022
Int. Cl.² B60C *11/06*
U.S. Cl. 152—209 R 5 Claims



1. A pneumatic tire comprising a tread formed with a plurality of isolated relief blocks and with grooves that delimit the relief blocks and that open onto the edges of the tread, the relief blocks having sections parallel to their surface of contact with the ground which have central ellipses of inertia which are substantially circular and identical, at least some of the relief blocks being formed with a recess and with a connecting groove communicating with the recess and with the closest delimiting groove, the delimiting grooves providing paths for the removal of water during travel of the tire on a wet road that extend obliquely forward in the direction of travel and facilitate discharge of the water at the edges of the tread, and each connecting groove being substantially straight and extending over substantially the shortest path between said recess and said closest delimiting groove.

3,998,257

SKID PREVENTER FOR VEHICLE TIRES

Matti V. V. Mayra, Myllykatu 2, 41160 Tikkakoski, Finland

Filed Mar. 20, 1975, Ser. No. 560,492
Claims priority, application Finland, Mar. 25, 1974, 902/74
Int. Cl.² B60C *11/14*
U.S. Cl. 152—210 7 Claims

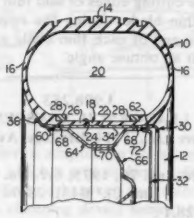
1. A stud which is insertable into the rubber tread of a vehicle tire, comprising a cylindrical stem portion having a base end insertable into the tire and an outer end adapted to extend out of the tire, a cylindrical flange portion affixed to said base end of said stem portion and substantially concentric with said stem portion and having an annular top surface, a hard metal pin affixed to said outer end of said stem portion, an annular locking ring on said stem portion between said flange and said pin being of a thickness substantially the same as said flange portion and having a bottom surface with a portion in contact with and of substantially the same configuration as a part of the top surface of said flange portion, said locking ring being supportable on said flange portion and having an inner diameter slightly larger than said stem and smaller than the exterior diameter of said flange and having an outer diameter larger than the outer diameter of said flange, said locking ring being adapted to engage the tire, said stem including an intermediate portion of greater diameter than the remaining portion of said stem and the inner diameter of said ring so that said ring is confined for movement between said intermediate portion and said flange.

3,998,258

EXPANDABLE TIRE RIM ARRANGEMENT AND METHOD OF INSTALLATION

Charles E. Grawey, and John J. Groezinger, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 28, 1975, Ser. No. 572,365
Int. Cl.² B60C *5/00*; B60B *23/02, 25/02*
U.S. Cl. 152—405 19 Claims



1. An expandable tire rim arrangement comprising;

a transversely split tire supporting rim having an outer peripheral tire engaging surface, an inner peripheral surface, and circumferentially relatively movable ends disposable between a reduced diameter position for ease of insertion of said supporting rim axially into a tire and an increased diameter position; and

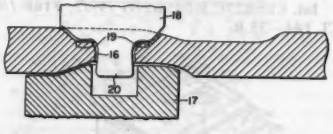
a rim expanding and wheel mounting assembly including a cylindrical surface portion somewhat larger than the diameter of said inner peripheral surface of said supporting rim when in its reduced diameter position and including tapered surface means on at least one of said supporting rim and said wheel mounting assembly for guidably assuring slidable insertion of said wheel mounting assembly in one axial direction into said supporting rim for expanding it to its increased diameter position and tightly against the tire.

3,998,259

DEBURRING AND DIE-SHAPING OF PUNCHED HOLES IN PRECISION MASS PRODUCED PARTS

Josef Zocher, Aachen, Haaren, Germany, assignor to The Singer Company, Elizabeth, N.J.

Filed Jan. 5, 1976, Ser. No. 646,726
Int. Cl.² B21G *3/28*
U.S. Cl. 163—5 2 Claims



2. A method of finish shaping and polishing the eye portion of a thread handling implement used in textile machinery in which the implement in blank form has been subjected to die-pressing operation whereby the eye portion is provided with initial transversely alined cavities divided by a web portion, comprising the steps of removing said web by means of a punch-pin operation, arranging the thread handling implement with one of its initial cavities resting on a supporting die, pressing a first shaping-die tool into the marginal portion of the opposite initial cavity with an eye sizing and polishing

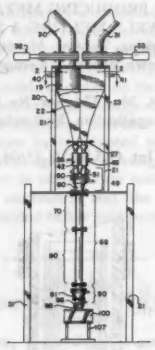
projection formed on the shaping-die tool extending into the eye, withdrawing the shaping-die tool so as to polish the wall defining the surface of the eye, arranging to support the thread handling implement on the now finished shaped initial cavity of the implement, pressing a second shaping-die tool into the marginal portion of the remaining initial cavity with an eye sizing and polishing projection formed on the shaping-die tool extending into the eye, and withdrawing the second shaping-die tool so as to finish polishing the wall defining the surface of the eye.

3,998,260

APPARATUS AND METHOD FOR MANUFACTURING CORES AND MOLDS WITH SECONDARY AIR INJECTION STAGE

Joseph N. Kopp, Chicago, and Bruce V. Morris, McHenry, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Apr. 21, 1975, Ser. No. 569,828
Int. Cl.² B22C *15/24*
U.S. Cl. 164—21 **15 Claims**



1. Apparatus for forming from a first mass of particulate matter coated with a catalyst-polymerizable resin film and a second mass of particulate matter coated with a catalyst film for polymerizing said resin, a hardened core or mold, said apparatus comprising, in combination:

means including a first staging hopper for storing a quantity of said first mass of particulate matter;

means including a second staging hopper for storing a quantity of said second mass of particulate matter;

a core box having an interior void defining said core or mold;

continuous conduit means including a conduit for establishing a continuous, confined flow path for said particulate masses from said first and second staging hoppers to said core box, said conduit means further including a mixing section comprising a static mixer means for mixing said masses as they pass through said conduit;

primary air injection means for establishing a continuous stream-like flow of said particles along said flow path whereby said first and second masses are thoroughly and rapidly intermingled and said films are at least partially integrated to form a catalyzed polymerizable resin-coated particulate mix for deposit directly in said core box; and

a secondary air injection means for injecting an additional air stream into said flow path at a predetermined position between said static mixer means and said core box to enhance said film integration.

12. The method of forming a foundry core or mold from a first mass of particulate matter coated with a catalyst-polymerizable resin film and a second mass of particulate matter coated with a catalyst film for polymerizing said resin, comprising the steps of:

simultaneously introducing said masses of particulate matter into a moving carrier air stream to form a high-velocity stream wherein substantially all of said particulate matter is suspended;

channelling said high velocity stream through a static mixer stage to intermingle said particulate masses and substantially integrate said films thereon;

depositing the resulting catalyzed-resin coated mixture in a shaping cavity; said high velocity stream being continuously confined between said introducing and said depositing;

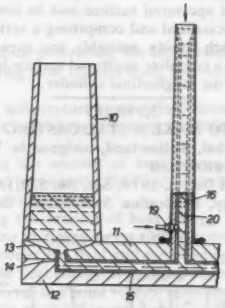
injecting air into said high velocity stream after said stream has been channelled through said static mixer stage to enhance the integration of said films; and, hardening the resulting catalyzed-resin coated mixture in said shaping cavity.

3,998,261

CASTING STEEL INGOTS

Rodney Barker, Sheffield, England, assignor to British Steel Corporation, London, England

Filed June 2, 1975, Ser. No. 582,789
Claims priority, application United Kingdom, June 18, 1974, 26971/74
Int. Cl.² B22D *7/00, 1/00*
U.S. Cl. 164—66 **8 Claims**



1. A method of casting steel in an ingot mould including supplying molten steel to the ingot mould through a runner system which exits into the bottom of the mould, said runner system including an upstanding refractory lined runner into which the steel is poured, and during the pouring of the steel introducing a gas into the molten steel in the upstanding runner such that gas bubbles are formed which entrain inclusions in the molten steel and at least some of which contact said refractory lined runner, the inclusions adhering to said refractory lining and thereby being removed from the molten steel before it passes into the mould.

3,998,262

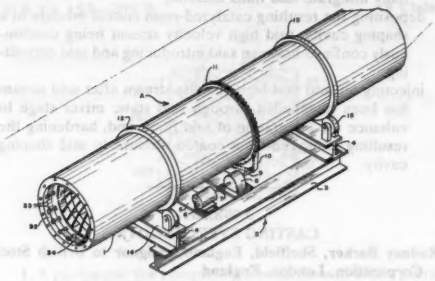
CASTING SHAKE-OUT UNIT AND METHOD OF OPERATION

Charles J. Didion, 1213 Cherbrook, St. Charles, Mo. 63301

Filed Jan. 6, 1975, Ser. No. 538,959
Int. Cl.² B22D *29/00*
U.S. Cl. 164—131 **27 Claims**

1. A casting shake-out unit of the type useful for facilitating the separation of a new casting from its mold sand or the like comprising a cylinder longitudinally disposed generally in an approximate horizontal position and arranged for slowly rotating around its longitudinal axis, bearing means povided for supporting said cylinder during its rotation, means cooperat-

ing with the cylinder for furnishing its slow speed of rotation, an apertured surface provided concentrically inwardly from the inner surface of said cylinder and designed for simultaneously rotating therewith, a series of helically arranged ribs formed upon the inner surface of said apertured surface and being arranged for urging the castings deposited thereon to move longitudinally of the rotating cylinder, a series of helically arranged vanes provided intermediate the apertured surface and the cylinder for inducing the movement of the



sand passing through the apertured surface to also be moved longitudinally of the cylinder, said helical ribs being integral with the inner surface of the apertured surface, the helical vanes being integral with the outer surface of said apertured surface, and said apertured surface and its integral ribs and vanes being sectionalized and comprising a series of modular components which during assembly are capable of fitting together to form a complete apertured surface inwardly of the inner surface of the longitudinal cylinder.

3,998,263

SYSTEM TO MAKE METAL CASTING MOLDS

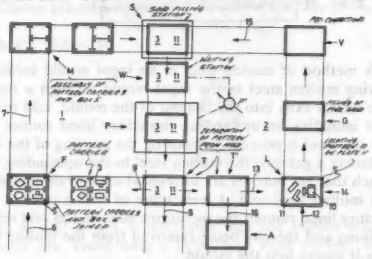
Fritz Iten, Balsthal, Switzerland, assignor to Von Roll AG, Gerlafingen, Switzerland

Filed Dec. 6, 1974, Ser. No. 530,159

Claims priority, application Switzerland, Dec. 13, 1973, 17484/73

Int. Cl.² B22C *25/00*

U.S. Cl. 164—181 **8 Claims**



1. A system to make casting molds, selectively, from repetitively used patterns assembled on pattern plates (3), and from loose patterns (10), having operating stations (F, M, M', S, P, L, T, T') including

a loading station (F. M. M') in which first mold boxes (5) are loaded with pattern plates (3);

means (T, 9) to return the pattern plates (3) after preparation of the mold, for re-use;

loading means (L) in which second mold boxes (5) are loaded with loose patterns (10);

a press station (P) to compress molding sand in the boxes,

and a conveyor transport system (17) to circulate the pattern plates, the loose patterns and the mold boxes;

said conveyor transport system comprising

a first conveyor portion solely handling pattern plates (3) and including said loading station (F, M, M') in which first mold boxes are loaded with pattern plates and said means (T, 9) to return the pattern plates, after preparation of the mold, for re-use;

a second conveyor portion solely handling loose patterns (10) and including said loading means (L) in which second mold boxes are loaded with loose patterns,

and a third common conveyor portion forming, together with said first conveyor portion (1) a first closed loop and, together with said second conveyor portion (2) a second closed loop, said third common conveyor portion including said press station (P) which forms a single press station common to both of said loops,

the conveyor transport system selectively feeding to said single press station (P), said first and second boxes loaded, selectively, with said pattern plates (3) and said single patterns (10), said conveyor transport system then feeding said boxes to the respective first and second conveyor portions of said first and second closed loops.

3,998,264

APPARATUS FOR PRODUCING METALLIC CASTINGS BY PROGRESSIVELY MELTING A SOLID CHARGE

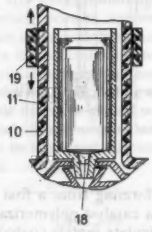
Lothar Norman Hocking, Taplow, Maidenhead, England, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 30, 1974, Ser. No. 519,338

Claims priority, application Switzerland, Nov. 5, 1973, 15440/73

Int. Cl.² B22D *35/06*

U.S. Cl. 164—251 **1 Claim**



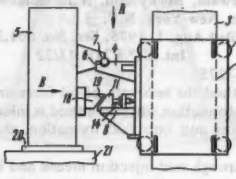
1. Apparatus for producing metallic castings comprising, an upright crucible provided with a bottom sprue opening into a mould supported in a casting box therebelow, said crucible being constructed to receive a solid metallic charge to be melted and cast and wherein an initial gap is provided between the metallic charge and a compressible refractory liner forming the inner wall surface of said crucible, and a high-frequency heating coil surrounding said crucible and which has the turns thereof arranged to effect a progressive melting of said metallic charge from the top down such that the initially melted upper part of said metallic charge flows downwardly through said gap into and refreezes in the lower part of said crucible so as to prevent discharge of melted metal through said sprue until the entire volume of the metallic charge has reached its molten state and reached a temperature higher than its melting temperature, said heating coil comprising an inner coil section having uniformly spaced turns extending over the entire height of the melting space within said crucible and an outer coil section surrounding said inner coil section and having a lesser number of turns and which is located at the upper portion of said crucible so as to apply more heat to the upper part of the metallic charge placed within said crucible, said outer coil section being adjustable longitudinally along said inner coil section to accommodate metal charges of different height within the crucible.

3,998,265

CRYSTALLIZER POSITIONING AND DISPLACING APPARATUS

Gennady Fedorovich Skvortsov, Prospekt Karla Marxa, 25, kv. 26; Lev Seliverstovich Kazantsev, ulitsa Rimskogo-Korsa-kova, 11, kv. 69, and Andrei Grigorievich Pomeschikov, ulitsa Rimskogo-Korsa-kova, 10, kv. 2, all of Novosibirsk, U.S.S.R.

Filed Feb. 20, 1976, Ser. No. 659,726
Int. Cl.² B22D 29/04
U.S. Cl. 164—342 2 Claims



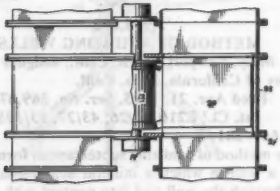
1. A crystallizer positioning and displacing apparatus comprising: a crystallizer with a suspension shaft; a movable carriage with gripping means adapted to engage the suspension shaft of said crystallizer; at least two wedge-shaped abutments provided on said movable carriage on the side thereof where said gripping means are arranged; wedge-shaped lugs provided on said crystallizer in alignment with said wedge-shaped abutments, said crystallizer being adapted to have said wedge-shaped lugs thereof abut against said wedge-shaped abutments when said crystallizer is retained on said movable carriage; said wedge-shaped abutments and the respective wedge-shaped lugs being situated below said suspension shaft of said crystallizer.

3,998,266

COMPARTMENT SUPPORT FOR VERTICAL SHAFT AIR PREHEATER

Harlan E. Finnemore, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Apr. 14, 1975, Ser. No. 568,340
Int. Cl.² F28D 19/04
U.S. Cl. 165—8 7 Claims



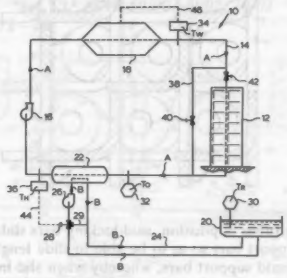
1. Rotary regenerative heat exchange apparatus having a rotor post disposed about a vertical axis, a plurality of essentially sector-shaped baskets arranged in lateral juxtaposition around the rotor post to comprise an annular rotor, a mass of heat absorbent material carried in the compartments of the rotor, housing means surrounding the rotor and having end plates with openings that permit a heating fluid and a fluid to be heated to flow through the rotor, means for rotating the rotor about its vertical axis to align the heat absorbent material of the rotor alternately with the heating fluid and the fluid to be heated, a pivotal linkage connecting the upper end of each sector-shaped basket to the rotor post, a support surface on said rotor post subjacent said pivotal linkage disposed radially inward from each sector-shaped basket and formed to include a substantially hemispherical depression, a surface having a similar depression formed therein on each basket confronting said rotor post, and an independent spherical key trapped between confronting hemispherical depressions adapted to support the rotor and permit pivotal movement between the rotor baskets and the vertical rotor post.

3,998,267

TEMPERATURE CONTROL SYSTEM

John Faiczak, Toronto, Canada, assignor to Canada Square Management Ltd., Toronto, Canada

Filed May 21, 1975, Ser. No. 579,342
Claims priority, application Canada, May 16, 1975, 227215
Int. Cl.² F25B 29/00
U.S. Cl. 165—48 23 Claims



1. A method of controlling the temperature in a building having a building heat transfer load, the method comprising the steps of:

a. passing a temperature control fluid through the building to transfer heat energy between the fluid and said building load;

b. predicting the amount of heat energy required to be transferred between the fluid and the building load over a predetermined interval;

c. measuring the amount of heat energy in the fluid and determining the existing available energy to be transferred between the fluid and the building load;

d. varying the heat energy in the fluid during said predetermined interval at a point remote from the building load if said existing available energy to be transferred is less than said energy required to be transferred, said variation being at a rate such that the total available energy to be transferred, as varied over the predetermined interval, is at least equal to said energy required to be transferred; and,

e. controlling the flow of the fluid so that said existing available energy to be transferred is dissipated at a rate proportional to the difference between the rate of transfer of energy between the fluid and the building load, and said rate of variation.

3,998,268

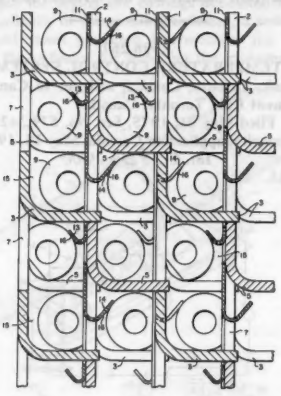
LOCKING DEVICE FOR STAGGERED FIN-TUBES

Stanley S. Sagan, Springfield, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 4, 1975, Ser. No. 555,214
Int. Cl.² F28B 9/00
U.S. Cl. 165—162 8 Claims

1. Support and locking apparatus for closely packed staggered tubes of a heat exchanger, said apparatus comprising a plurality of support bars having two sets of arms which are generally normal to said support bars and extend outwardly from one of the sides thereof, one set of arms being one-half pitched out of phase with respect to the other set of arms, said support bars having openings which register with the arms of

the adjacent support bars to support the distal end of said arms, adjacent support bars being mirror images so as to interlock, and a plurality of locking bars disposed generally parallel to said support bars, said locking bars having feet which extend from said locking bars so as to engage the tubes



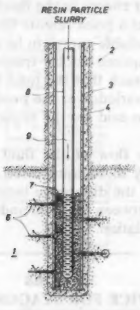
to hold the tubes in position, said locking bars slidably engaging said support bars so as to be able to slide lengthwise with respect to said support bars, whereby when slid in one direction the feet engage the tubes and when slid in the opposite direction the feet move away from the tubes freeing said tubes so that they may be removed from said support bars.

3,998,269

PLUGGING A SUBTERRANEAN RESERVOIR WITH A SELF-SEALING FILTER CAKE

James H. Lybarger, Metairie, La., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 10, 1975, Ser. No. 621,264
Int. Cl.² E21B *33/138*
U.S. Cl. 166—250 **8 Claims**



1. A process for plugging a permeable subterranean earth formation, comprising:

suspending particles of a solid resin capable of softening and resolidifying at the temperature of said earth formation in a relatively inert carrier liquid comprising a water solution of sodium chloride;

correlating the sizes of the particles with the sizes of the pores of said earth formation so that, when the suspension is injected into the formation, the particles are screened out and deposited on the face of the formation and within the first few inches beyond its face;

correlating the composition of the particles with the temperature of the earth formation so that the particles deposited on and within the formation are capable of becoming fused into a substantially impermeable layer; and

injecting the suspension into the earth formation so that the particles are so deposited and fused.

3,998,270

OIL RECOVERY BY WATERFLOODING EMPLOYING GRAPHITE OXIDE FOR MOBILITY CONTROL

Paul G. Rodewald, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,334
Int. Cl.² E21B *43/22*
U.S. Cl. 166—275 **18 Claims**

1. In a method for recovery of oil from an oil-containing subterranean formation wherein a fluid is injected through an injection means and into said formation, the improvement comprising:

injecting through said injection means and into said formation and aqueous dispersion of a graphite oxide.

3,998,271

MULTIPLE FRACTURING OF SUBTERRANEAN FORMATIONS

Claude E. Cooke, Jr.; John W. Graham, and Thomas W. Muecke, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Oct. 31, 1975, Ser. No. 627,738
Int. Cl.² E21B *43/26*
U.S. Cl. 166—280 **9 Claims**

1. A method of fracturing a subterranean formation penetrated by a well which comprises:

a. injecting through said well and into said formation a fracturing fluid for forming a fracture therein;

b. placing particulate propping agent in said fracture;

c. consolidating at least a portion of said propping agent into a permeable mass;

d. injecting through said well and into said formation a fracturing fluid to refracture said formation; and

e. introducing particulate material into said fracture produced by said refracturing step.

3,998,272

METHOD OF ACIDIZING WELLS

George P. Maly, Newport Beach, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Apr. 21, 1975, Ser. No. 569,877
Int. Cl.² E21B *43/26*, *43/27*, *33/138*
U.S. Cl. 166—281 **18 Claims**

1. In the method of acidizing subterranean formations penetrated by a well in which a mineral acid-containing fluid is injected through the well and into contact with the subterranean formation at an elevated pressure higher than the pressure of the formation whereby the mineral acid-containing fluid is forced from the well into the formation, the improvement which comprises:

a. injecting a dispersion of spherical-shaped discrete, solid, oil-soluble polyvinyl acetate particles in a carrier liquid as a slug before, following or between slugs of mineral acid-containing fluid, which particles filter out and bridge on the face of the formation and form a low fluid permeability filter cake on the face of the formation,

b. subsequently injecting a further slug of a mineral acid-containing fluid which is diverted into less permeable portions of the formation, and

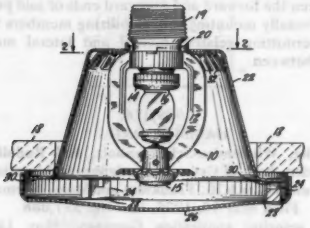
c. finally contacting the polyvinyl acetate particles with an oil in which they are soluble.

3,998,273

APPARATUS FOR USE WITH A FIRE SAFETY DEVICE

Richard F. Juliano, Bronxville, N.Y., assignor to The Reliable Automatic Sprinkler Company, Inc., Mount Vernon, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,360
Int. Cl.² A62C 37/12
U.S. Cl. 169—37 15 Claims



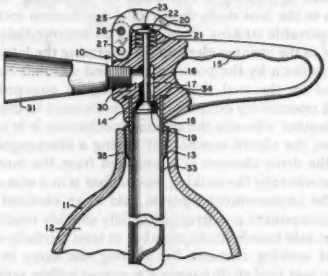
1. Apparatus for use with a fire safety device, the apparatus comprising: a non-magnetic first member; a second member; a magnet between the members; fusible means for attaching the magnet to the first member; and means for attaching the magnet to the second member, at least one of the second member and part of the fusible means being magnetic whereby the magnet magnetically holds the first member to the second member until heat, as from a fire, melts at least part of the fusible means to release the first member from the magnet and, thereby, from the second member.

3,998,274

FIRE EXTINGUISHER HEAD ASSEMBLY

James P. Liautaud, River and Bluff Road, Trout Valley, Cary, Ill. 60013

Filed May 15, 1975, Ser. No. 577,937
Int. Cl.² A62C 13/00
U.S. Cl. 169—89 17 Claims



1. In a fire extinguisher of the type having a pressurized fluid container having a neck opening therein, a head assembly comprising, in combination:

a body member molded of a plastic material, said body member including a passageway having a valve seat disposed therein;

a valve member slidably disposed within said passageway, said valve member coacting with said valve seat to restrict the flow of said fluid through said passageway;

user-actuable trigger means for forcing said valve member away from said valve seat to dispense said fluid product through said passageway;

a handle;

means including a tube segment formed of a relatively high strength material for establishing fluid communication between said passageway and the interior of said container, one end of said tube segment being molded into said body member and the other end extending through said neck opening and into said interior; and

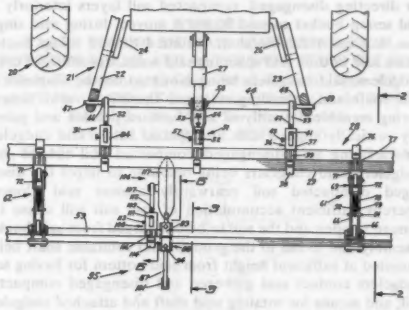
fastening means on said tube segment for establishing a mechanically rigid pressure-sealed engagement between said tube segment and said container.

3,998,275

EARTHWORKING IMPLEMENT AND ROW GUIDE APPARATUS

Fred W. Eisenhardt, Fargo, N. Dak., assignor to Alloway Manufacturing Inc., Fargo, N. Dak.

Continuation-in-part of Ser. No. 474,048, May 28, 1974, abandoned. This application May 6, 1975, Ser. No. 574,912
Int. Cl.² A01B 69/00, 49/02, 79/02
U.S. Cl. 172—26 35 Claims



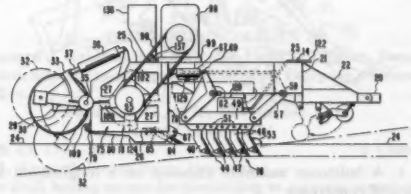
1. An earthworking implement mountable on a draft vehicle comprising: a transverse beam, hitch means for connecting the beam to the draft vehicle, transverse tool bar means located rearwardly of the beam, linkage means connecting the tool bar means to the beam, and row guide means mounted on the tool bar means for guiding the implement along a furrow in the ground, said row guide means including a rotatable resilient wheel having convex side walls joined to a circular center section surrounding an annular chamber, first support means mounting the wheel on the tool bar means, a furrowing tool located behind the wheel, and second support means mounting the furrowing tool on the tool bar means behind the wheel and in general longitudinal alignment with the wheel.

3,998,276

PLOW AND EARTH FRAGMENTATION MACHINE

Douglas M. MacMillan, 710 Chemeketa Drive, San Jose, Calif. 95123

Filed Nov. 4, 1974, Ser. No. 520,196
Int. Cl.² A01B 49/02, 33/02, 61/00, 63/10
U.S. Cl. 172—67 2 Claims



1. A deep earth-working combination plow and fragmentation apparatus for the single-pass processing of compacting soil layers, said apparatus comprising: a frame suitable for moving a plurality of earth-processing assemblies in earth-

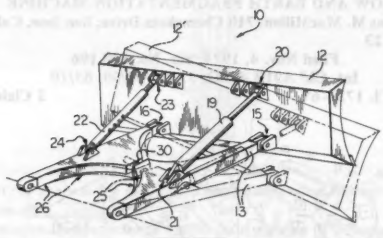
working relationship with said soil layers; a scarifier assembly mounted to said frame for disengaging compacted soil; an earth fragmentation assembly mounted to said frame immediately behind said scarifier assembly; said fragmentation assembly comprising, a scoop bucket assembly having an open leading portion and an open trailing portion provided with a yieldable closure, said open leading portion for gathering said disengaged compacted soil, said trailing portion for discharging soil when said closure is open, said scoop bucket assembly having a fixed bottom with attached walls at either side thereof, said walls fixedly connecting said bottom to said frame, said trailing portion being at the rear of said bottom and being spaced above the ground, said closure having a lower margin terminating substantially at said bottom, there being a moldboard attached to said leading portion at said bottom, said moldboard extending angularly forwardly of said leading portion and extending rearwardly and upwardly to a position directly over a forward portion of said fixed bottom for directing disengaged, compacted soil layers interiorly of said scoop bucket as said frame is moved during said single pass, a single rotatable shaft mounted to said scoop bucket above said bottom and spanning said walls, a plurality of earth cudgelers, said cudgelers being mounted on the diameter of said shaft and extending outward therefrom, said bottom having means rearwardly of said forward portion and generally vertically aligned with and spaced below said cudgelers for elevating said disengaged compacted soil toward said cudgelers, said cudgelers being operable to impel the disengaged compacted soil rearwardly against said closure, whereby sufficient accumulation of said soil will cause the closure to open and the soil to be discharged from said bucket assembly and to fall to the ground, said rotatable shaft being mounted at sufficient height from said bottom for having said cudgelers contact said gathered and disengaged compacted soil; and means for rotating said shaft and attached cudgelers in a direction to cause the cudgelers to direct the soil rearwardly toward said closure, said fixed bottom being the sole means for supporting the gathered and disengaged compacted soil in the scoop bucket assembly rearwardly of the moldboard and below the cudgelers whereby said impelled disengaged soil interiorly of said scoop bucket is fragmentized by said rotating cudgelers before being discharged.

3,998,277

BULLDOZER ASSEMBLY WITH MEANS FOR PIVOTALLY CONNECTING THE PUSH ARMS THEREOF

Leon A. Wirt, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 30, 1975, Ser. No. 627,314
Int. Cl.² E02F 3/76
U.S. Cl. 172—804 **11 Claims**



1. A bulldozer assembly disposed on a longitudinal axis thereof comprising

a blade normally disposed transversely relative to said axis,

a pair of laterally spaced push arms extending in the direction of said axis and each having a forward end thereof pivotally connected to said blade by first pivot means and second pivot means on a rearward end of each push arm adapted to pivotally mount such push arm on a frame of a vehicle,

a pair of stabilizing members each having an outboard end thereof integrally secured to a respective one of said push arms and both extending inwardly towards said axis to dispose inboard ends thereof adjacent to each other, and

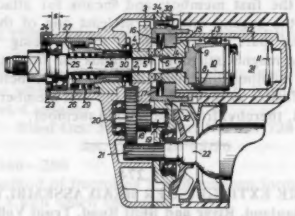
third pivot means disposed perpendicular relative to said axis and further disposed at least substantially midway between the forward and rearward ends of said push arms for pivotally mounting said stabilizing members together for permitting relative pivotal and lateral movement therebetween.

3,998,278

HAMMER DRILL

Erwin Stiltz, Winnenden-Schelmenholz, and Rudolf Hoyer, Winnenden, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 13, 1975, Ser. No. 577,086
Claims priority, application Germany, May 14, 1974, 2423332
Int. Cl.² E21C 1/12
U.S. Cl. 173—13 **11 Claims**



1. In a hammer drill including a housing; a tool shaft rotatably and axially displaceably supported in the housing; power means; gearing means connecting the power means with the tool shaft; a striking mechanism for imparting successive impacts to the tool shaft, the striking mechanism including an axially movable striking element and an intermediate member coupled to the striking element for operating the latter; a drive element driven by the power means; and a clutch component mounted on the tool shaft and having an engaged state in which it operatively couples the drive element to the intermediate member whereby the striking mechanism is in an operating state, the clutch component having a disengaged state in which the drive element is disengaged from the intermediate member whereby the striking mechanism is in a non-operating state; the improvement wherein said drive element and said clutch component are arranged axially slidably relative to one another; said intermediate member at least partially surrounding said striking element for guiding the same in its axial motion; said tool shaft having a terminus within said housing, said terminus being positioned externally of the outline of said striking mechanism.

3,998,279

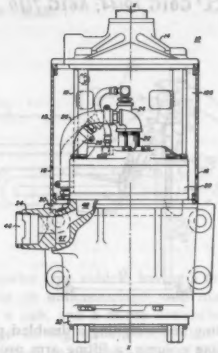
AIR MANIFOLD AND DELIVERY PASSAGEWAYS FOR ROCK DRILL

Edward A. Bailey, Newport, and George A. Hibbard, Claremont, both of N.H., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Continuation of Ser. No. 246,136, April 21, 1972, abandoned. This application June 21, 1974, Ser. No. 481,627
Int. Cl.² E21C 1/12
U.S. Cl. 173—105 **11 Claims**

1. A fluid operated rock drill apparatus comprising: a housing including axially aligned backhead and yoke portions, and a cylinder portion located therebetween; said cylinder portion

adapted to receive a reciprocable piston therein for delivering impact blows as such piston moves in the direction toward said yoke portion; delivery passage means in said cylinder portion for conveying a selectively controlled flow of pressurized fluid to reciprocate such piston; passageway means located in and



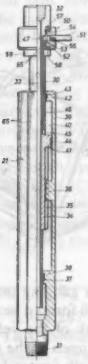
externally accessible of said yoke portion; and said delivery passage means communicating with the exterior of said housing only through said passageway means whereby such flow of pressurized fluid is available for reciprocating such piston only through a source of pressurized fluid communicating with said passageway means.

3,998,280

WAVE MOTION COMPENSATING AND DRILL STRING DRIVE APPARATUS

James W. Kisling, III, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Sept. 4, 1973, Ser. No. 394,040
Int. Cl.² E21B 7/12
U.S. Cl. 175—5 8 Claims



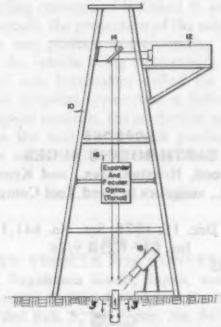
1. A wave motion compensating and drill string drive apparatus comprising: an inner member telescopically received within an outer member, said members having piston and cylinder means adapted to receive and exhaust hydraulic fluid under pressure during relative longitudinal movement, one of said members having connecting means adapted for connection to a suspension device and the other of said members having connecting means adapted for connection to a drill string; means for transmitting torque applied to said outer member to said inner member; said outer member having a polygonal outline to provide a plurality of external drive surfaces arranged to be engaged by the rotary of a drilling rig; and a flow coupling assembly on said one member for connecting a source of hydraulic fluid to said piston and cylinder means, said assembly being constructed and arranged to enable rotation of said one member with respect thereto; said piston and cylinder means including a first piston on said inner member that is sealingly slidable against said outer member, and a second piston on said outer member that is sealingly slidable against said inner member above said first piston, and annular cylinder space being provided between said first and second pistons.

3,998,281

EARTH BORING METHOD EMPLOYING HIGH POWERED LASER AND ALTERNATE FLUID PULSES

Winfield W. Salisbury, 11 Glenn Road, Belmont, Mass. 02178, and Walter J. Stiles, Tuscon House, Tuscon, Ariz. 85705

Filed Nov. 20, 1974, Ser. No. 525,442
Int. Cl.² E21B 7/14; E21C 21/00
U.S. Cl. 175—16 15 Claims



1. A method of earth boring comprising fusing successive annular regions of the stratum to be penetrated to shatter and eject successive cores from the strata by directing a high powered coherent light beam downwardly onto each successive annular region from a location above the stratum to be penetrated; pulsing said beam at a pre-determined rate; directing a fluid blast in contact with the strata contacted by said beam and pulsing said fluid blast alternately with said beam to shatter the core and clear away material thus removed from the earth.

3,998,282

EARTH BORING AUGER

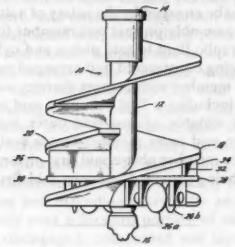
Leonard J. Robbins, Pottsboro, and Lloyd D. Stewart, Dennison, both of Tex., assignors to Reed Tool Company, Houston, Tex.

Filed Dec. 15, 1975, Ser. No. 641,041
Int. Cl.² E21B 9/24
U.S. Cl. 175—335 5 Claims

1. An earth boring auger, comprising
a shaft having means for connecting to a power source on one end thereof,
a flighting helically surrounding and secured to said shaft,
said flighting having a leading edge near the end of said shaft opposite said connecting means,
at least one cutter assembly including

a disc cutter and means for rotatively mounting said disc cutter for rolling cutting motion, and

means supporting said cutter assembly from said flighting near the drilling end of and spaced radially from said shaft



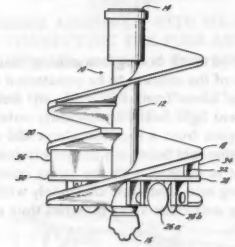
a substantial distance behind the leading edge of said flighting and extending longitudinally beyond said flighting whereby said cutter engages the formation to be bored with a rolling cutting motion to cut a kerf therein prior to engagement of said flighting with said formation.

3,998,283

EARTH BORING AUGER

Byron W. Chitwood, Houston, Tex., and Kendall E. Keene, Evansville, Ind., assignors to Reed Tool Company, Houston, Tex.

Filed Dec. 15, 1975, Ser. No. 641,113
Int. Cl.² E21B 9/24
U.S. Cl. 175—335 4 Claims



1. An earth boring auger, comprising

a shaft having means for connecting to a power source on one end thereof,

a flighting helically surrounding and secured to said shaft,

said flighting having a leading edge near the end of said shaft opposite said connecting means,

at least one cutter assembly including

a disc cutter and means for rotatively mounting said disc cutter for rolling cutting motion, and

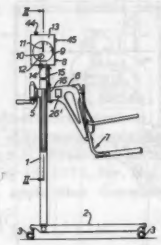
means supporting said cutter assembly from said flighting near the drilling end of said shaft whereby said cutter extends below said flighting and engages the formation to be bored with a rolling cutting motion to cut a kerf therein prior to engagement of the leading edge of said flighting with said formation.

3,998,284

INVALID HOISTS

David Richard James, Hasfield, England, assignor to Mecanaids Limited, England

Filed July 1, 1975, Ser. No. 592,270
Claims priority, application United Kingdom, July 26, 1974, 33057/74
Int. Cl.² G01G 19/44; A61G 7/10
U.S. Cl. 177—147 10 Claims



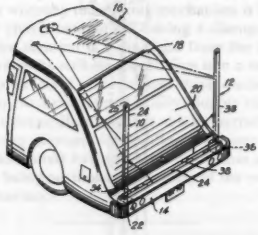
1. Means for lifting and weighing a disabled person, comprising an upstanding column, a lifting arm projecting from the column, elevating mechanism associated with the column and operative to raise and lower the arm, and weighing means mounted on the column and directly responsive to the stress or strain in an element of the elevating mechanism, which stress or strain is directly related to the total arm weight at the column whereby the weighing means are responsive to the weight of the arm and any load supported therefrom.

3,998,285

VEHICLE PARKING GUIDE

Stephen Robert Cooper, 246 Sunrise Hill Court, Norwalk, Conn. 06851

Filed Sept. 22, 1975, Ser. No. 615,233
Int. Cl.² B60K
U.S. Cl. 180—1 AP 16 Claims



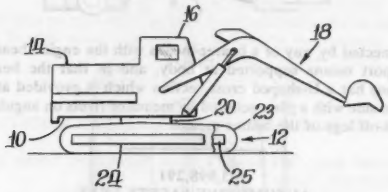
1. A parking guide for gauging the back of a vehicle comprising a guide rod, a well formed between the rear bumper of the vehicle and the trunk of the vehicle to pivotally receive said guide rod, said well open at the top thereof and including a bottom wall and side walls upstanding therefrom, and means connected to the pivotal guide rod for moving said guide rod in a substantially vertical plane from a substantially horizontal position within said well adjacent to said rear bumper to a substantially vertical position upstanding from said well so that said guide rod may be viewed by the driver of the vehicle and thereafter back to said horizontal position so that said guide rod may be disposed in said well.

3,998,286

MECHANICALLY, LATERALLY ADJUSTABLE TREADS FOR CRAWLER VEHICLES

Zdenek Ponikelsky, Plancenoit, and Gerard M. G. J. Collignon, Fleurus, both of Belgium, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 19, 1975, Ser. No. 633,351
Int. Cl.² B62D 55/00
U.S. Cl. 180—9.48 6 Claims



1. In a crawler type vehicle having a main frame rotatably connected to an undercarriage, said main frame having a power unit, a cab, and a boom connected thereto and said undercarriage having a car body, first and second roller frames connected on opposed sides of the car body, and first and second continuous tracks each connected to a respective roller frame and to the power unit, the improvement comprising:

means for connecting each of the roller frames to the car body for independent movement between a first position at which a roller frame and associated track are maintained a first distance from a respective side of the car body and a second position at which the roller frame and associated track are maintained a second greater distance from a respective side of said car body, said means comprising

a set of first and second spaced car body flanges extending outwardly from opposed sides of the car body, each set of first and second flanges having at least first, second, and third systems of bolt holes positioned at preselected locations;

first and second connecting plates fixed to each of the roller frames adjacent a respective car body flange, each first and second connecting plate having at least first, second, third, and fourth systems of bolt holes positioned at preselected locations, said bolt holes of the first and third systems through the associated plates and car body flanges being substantially coaxial at the first position of the respective roller frame and associated track, said bolt holes of the second, third, and fourth systems of bolt holes through the plates being substantially coaxial with the bolt holes of respective first, second, and third systems of bolt holes through the flanges at the second position of the respective roller frame and associated track, and said second and fourth systems of plate bolt holes being spaced from bolt holes of the respective flanges and being covered by said flanges at the first position of the roller frame for assuring desired connections of the roller frames to the car body at the first and second positions of the roller frames.

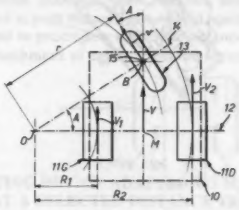
3,998,287

HYDROSTATIC TRANSMISSION VEHICLES

Michel Paramythioti, Chantilly, France, assignor to Albaret S.A., Rantigny, France

Filed Mar. 10, 1976, Ser. No. 665,532
Claims priority, application France, Mar. 12, 1975, 75.07655
Int. Cl.² B62D 61/08
U.S. Cl. 180—25 R 10 Claims

1. A hydrostatic transmission vehicle of the kind which bears upon the ground by means of at least two longitudinally staggered running assemblies, one of said running assemblies, hereinafter called the driving running assembly being speed controllable by a speed control system, while another of the said running assemblies, hereinafter called the motor-director running assembly, is mounted for pivoting as a whole about a steering spindle under the action of a direction control system the said motor-director running assembly also being speed controllable by means of a speed control said speed control of the motor-director running assembly being coupled with said speed control of the driving running assembly, the said cou-



pling connection comprising a rocker lever mounted for pivoting and having on each side of its pivot;

a. a first arm hereinafter called the constant arm, by which said coupling connection is linked to any one of the said speed controls, the projection of the said constant arm on a median rest position corresponding to straight-ahead travel of the vehicle being substantially constant; and

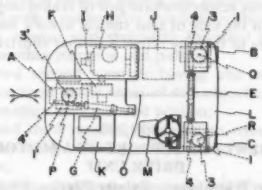
b. a second arm hereinafter called the variable arm by which said coupling connection is linked to the other of the said speed controls, the projection of the said variable arm upon the said median rest position being variable under the action of the direction control system.

3,998,288

WHEELED VEHICLE FOR CONVEYING LOADS

Osamu Aoki, Nagahama Kochi, Japan, assignor to Shikoku Kenki Kabushiki Kaisha, Yokohama Kochi, Japan

Filed Feb. 5, 1975, Ser. No. 547,335
Claims priority, application Japan, May 7, 1974, 49-52447
Int. Cl.² B62D 61/06
U.S. Cl. 180—26 R 4 Claims



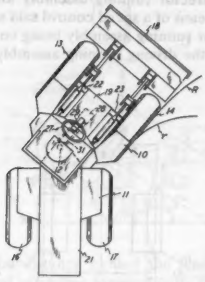
1. In a wheeled vehicle for mounting means for conveying loads, the improvement comprising a machine bed, wheel fitting yokes carrying a rear wheel and two front wheels, respectively, attached to said machine bed, said rear wheel yoke being attached to the rear center of said machine bed, and said front wheel yokes being attached to both front sides of said machine bed, said rear wheel and one of said front wheels being independently powered by oil pressure motors, an independently operable oil pressure power cylinder for rotating said rear wheel yoke through a steering angle and an independently operable oil pressure power cylinder for simultaneously rotating said front wheels through opposite and equal steering angles.

3,998,289

BRAKE SYSTEM FOR AN ARTICULATED VEHICLE

Herman Joseph Maurer, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Nov. 5, 1975, Ser. No. 628,989
Int. Cl.² B62D 11/00
U.S. Cl. 180—6.64 1 Claim



1. A brake system for an articulated vehicle comprising an articulated vehicle having a front portion and a rear portion pivotally connected together in tandem about an upright axis for steering said portions relative to each other to effect turning of the vehicle, a steering mechanism including an operator controlled steering wheel and being interconnected between said portions for steering said portions and establishing a steering radius for a maximum steering articulation, a left-side wheel and a right-side wheel mounted on each of said portions for supporting the vehicle on the ground, a wheel brake operatively connected with each of said wheels to present a pair of said brakes on each side of said vehicle, a flexible brake line connected exclusively separately and respectively between each of said pairs of wheel brakes on the two said left-side wheels and the two said right-side wheels, each respective said brake line extending uninterruptively and uniformly to and between said pairs of wheel brakes for separate and independent actuation of said pairs of wheel brakes, and two brake pedals mounted on said vehicle and with each thereof exclusively separately and respectively connected with said brake lines for braking the two said left-side wheels and the two said right-side wheels selectively and independently of the other two, said flexible brake lines being sufficiently flexible and of lengths to extend between each said pairs of brakes at the time when said maximum steering articulation is effected and to thereby have the respective said pair of brakes stop rotation of said wheels on the side of said vehicle toward the axis of the steering radius to thereby effect a further shortened steering radius.

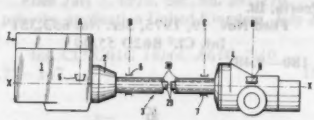
3,998,290

ARRANGEMENT FOR SUPPORT OF A MOTOR VEHICLE DRIVE UNIT

Rolf V. Sivers, Warmbronn; Reimer Pilgrim, Ditzingen; Wolfgang Hanisch, Wimsheim, and Erich Stotz, Rommelshausen, all of Germany, assignors to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft, Germany

Filed Dec. 6, 1974, Ser. No. 530,297
Int. Cl.² B60K 17/22
U.S. Cl. 180—70 P 27 Claims

1. An installation for the support of a drive unit of a motor vehicle which includes an internal combustion engine with a clutch, at least one change-speed transmission and an axle gear, and in which the internal combustion engine is connected with the axle gear by way of a tubular support means, characterized in that the internal combustion engine with the clutch, the tubular support means and the axle gear are fastened at the vehicle body respectively by way of elastic bearing support means which are provided within the areas of low vibrations of the aggregates of the drive unit and are held, at least in part, in supporting means which are relatively form-rigid, yet vibration-damping, the internal combustion engine is



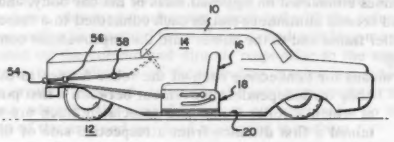
connected by way of a bearer means with the engine bearing support means supported at body, and in that the bearer means has a U-shaped cross section which is provided at its open side with a plate secured by means of rivets on angularly bent-off legs of the bearer means.

3,998,291

AUTOMOTIVE SAFETY SEAT

Edwin George Davis, 2116 Cedar Run Drive, Camp Hill, Pa. 17011

Filed Aug. 6, 1975, Ser. No. 602,285
Int. Cl.² B60R 21/10
U.S. Cl. 180—91 5 Claims



1. A safety device for a vehicle comprising a base mounted to the vehicle; first and second guide means on said base, said first guide means extending a distance along the base in the direction of travel of the vehicle, the second guide means being located below the first guide means and extending rearwardly beyond the end of the first guide means and then upwardly to an end at the same level as the first guide means; a seat in the vehicle mounted on the base and including a first member engagable with said first guide means for movement there along and a second member engagable with said second guide means for movement there along, said members being located at the ends of said guide means when the seat is in the normal position in the vehicle; a release member between said seat and base for securing the seat in said normal position; a spring extending between said seat and base normally biasing said seat so that when the release member is opened the second member moves along said second guide means away from its end; an energy absorbing unit on the base in the path of movement of the second member along the second guide means; and a sensor at the front of the vehicle operable to open said release member upon front end impact whereby said spring moves said second member along said second guide means to rotate the seat rearwardly and, with further movement of said second member, cooperates with said energy absorbing unit to slow forward movement of the seat.

3,998,292

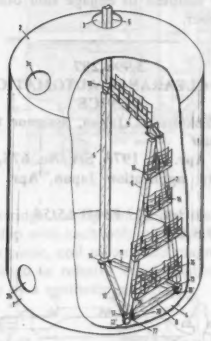
SCAFFOLD

Johan Leo Maria Holterbosch, Utrecht, Netherlands, assignor to Holterbosch Engineering, B.V., Utrecht, Netherlands

Filed Aug. 26, 1975, Ser. No. 607,796
Claims priority, application Netherlands, Aug. 29, 1974, 7411510
Int. Cl.² E04G 1/36
U.S. Cl. 182—128 6 Claims

1. A free standing scaffold for carrying out activities inside a tank having a substantially cylindrical side wall and a roof

with a manhole centrally provided therein, comprising a central mast supported only on the bottom of the tank, a scaffold section for carrying operating platforms rotatably connected to said central mast for movement therearound and composed of a pair of upwardly converging columns forming the upright sides of a triangle, a laterally extending beam pivotally connected at one end to the tops of said pair of columns and rotatably and pivotally connected at the other end to said central mast, and a pair of radially extending legs respectively pivotally connected at one end to the bottom portions of said



pair of columns and rotatably and pivotally connected at the other end to said central mast, means connected to the bottom portions of said pair of columns movably supporting said scaffold section on the bottom of the tank and stabilizing said central mast, all of said scaffold members being connected together for mutual pivotal movement and each having cross-sectional dimensions less than the diameter of the manhole, whereby the scaffold members can be lowered into the tank via the manhole and assembled into the free standing scaffold inside the tank.

3,998,293

LADDER EXTENSION AND LEVELER

Alfred Raia, Kinnelon, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 14, 1975, Ser. No. 604,710
Int. Cl.² E06C 7/44
U.S. Cl. 182—204 **3 Claims**

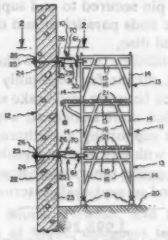
1. A ladder leveling and extension device for use in connection with one distal end of a ladder side rail and hollow ladder rungs, comprising a vertically slideable, elongated U-shaped channel member adapted to embrace and frictionally engage said side rail, a plurality of apertures spaced a predetermined distance apart and centrally disposed in a single vertical row along the longitudinal axis of said channel member, said predetermined distance corresponding to the distance between successive ladder rungs, removable connecting means for maintaining said channel member in a fixed vertical position relative to said side rail, said connecting means including an elongated shaft member, said shaft member having an enlarged head portion at one end, a length greater than the width of said ladder, a diameter less than the inside diameter of said rungs and removable securing means at the opposite end from said one end for enlarging said opposite end to a dimension greater than said inside diameter, said apertures having a greater diameter than said shaft member, said shaft member being adapted to pass through one of said apertures and one of said rungs and to protrude a sufficient distance from said rung to permit attachment of said removable securing means.

3,998,294

CONNECTING DEVICE ADAPTED TO MAINTAIN AN OBJECT AT A SELECTED DISTANCE FROM A WALL

Melvin A. Moeller, 282 Stenzil St., North Tonawanda, N.Y. 14121

Filed Feb. 4, 1976, Ser. No. 655,254
Int. Cl.² E04H 17/00; E04G 25/04
U.S. Cl. 182—229 **9 Claims**



1. A connecting device adapted to maintain an object at a selected spaced distance from a wall, one of said object and wall provided with a member having a stationary threaded portion operatively arranged to face the other of said object and wall, said device comprising:

an elongated first member having one marginal end portion provided with a cooperative threaded portion adapted to matingly engage said stationary threaded portion, and having another marginal end portion;

an elongated second member having one marginal end portion secured to the other of said object and wall, and having another marginal end portion;

an elongated third member arranged to overlap each of such other marginal end portions of said first and second members;

interlock means arranged to secure said first and third members together at any selected one of a plurality of longitudinally-spaced relative incremental positions therebetween for adjustably fixing the extent of overlap between said first and third members; and

rotation means operatively arranged between said second and third members for preventing substantial relative longitudinal movement therebetween, but for permitting said third member to be freely rotated relative to said second member;

whereby the length of said connecting device may be coarsely varied by adjusting said interlock means to vary the extent of overlap between said first and third members, and may be finely adjusted by rotating said third member relative to said second member.

3,998,295

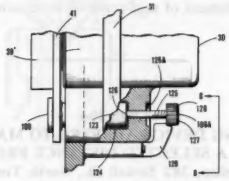
BRAKE STRUCTURE AND ADJUSTING DEVICE THEREFOR

Thomas C. Martin, c/o Wolf Greenfield & Sacks, 185 Devonshire St., Boston, Mass. 02110

Division of Ser. No. 419,336, Nov. 27, 1973, Pat. No. 3,899,049, which is a continuation of Ser. No. 233,962, March 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 61,258, Aug. 5, 1970, abandoned, and a continuation-in-part of Ser. No. 849,312, Aug. 12, 1969, abandoned. This application May 21, 1975, Ser. No. 579,387

Int. Cl.² F16D 65/38

U.S. Cl. 188—71.7 6 Claims



1. Adjustable disc brake apparatus supported on a caliper housing comprising:

at least one brake shoe and associated brake pad,

at least one guide pin secured to and supporting said brake shoe at opposite ends parallel to said disc and for movement toward said disc,

said guide pins slideably engaged within sleeves in said caliper housing, means for adjustably limiting the non-actuated distance between said brake shoe and disc comprising a threaded shaft associated with each said guide pin, and means supporting said threaded shafts in said caliper housing with one end engageable with the end of said associated guide pin remote from said brake shoe and the other end of said shaft external of said housing.

3,998,296

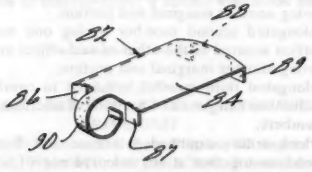
ANTI-RATTLE SPRING FOR A MOTOR VEHICLE DISC BRAKE

Trevor N. James, St. Clair Shores, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 159,381, July 2, 1971, abandoned. This application Sept. 15, 1975, Ser. No. 613,769

Int. Cl.² F16D 55/224

U.S. Cl. 188—73.5 6 Claims



1. In a disc brake having a rotor including a pair of opposed friction faces, a torque member disposed adjacent said rotor and having a pair of opposed inner edges, a friction element slidably mounted on said torque member and having portions adjacent each of said inner edges, and actuating means for urging said friction element into engagement with one of said friction faces, anti-rattle means comprising:

a resilient body portion disposed between one of said inner edges and a corresponding portion of said friction element, the resiliencey of said body portion yieldably urging said friction element toward the other inner edge;

retaining means extending from one edge of said body portion and engaging said torque member;

resilient means yieldably maintaining said retaining means in engagement with said torque member to lock said anti-rattle means in place;

said retaining means including lug means extending from said one edge of said body portion to engage one side of said torque member;

said resilient means extending from another edge of said body portion and engaging the other side of said torque member, whereby said resilient means yieldably maintains said lug means in engagement with said one side of said torque member; and

lug means extending from said another edge of said body portion and adapted to engage said other side of said torque member.

3,998,297

BRAKE SHOE CLEARANCE AUTOMATIC ADJUSTING DEVICE

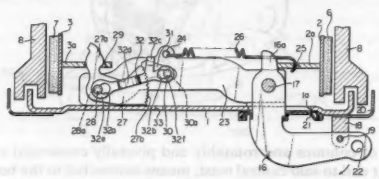
Masami Aono, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Apr. 12, 1976, Ser. No. 675,895

Claims priority, application Japan, Apr. 10, 1975, 50-48663[U]

Int. Cl.² F16D 65/58

U.S. Cl. 188—79.5 GT 6 Claims



1. A brake shoe clearance automatic adjusting device of a shoe drum brake comprising a strut member disposed between a pair of arcuate shoes and having a generally L-shaped ratchet member pivotally mounted on one end thereof, a projecting portion formed on one end of said ratchet member for projecting into an opening formed in a web of one of the shoes with a clearance, the other end of the strut member being operably connected with the other shoe, ratchet teeth formed on the other end of the ratchet member, a pawl member pivotally mounted on the strut member for meshingly engaging with the ratchet teeth, said meshing engagement between the pawl member and the ratchet teeth will slip off when the projecting portion of the ratchet member moves with said one shoe towards the drum, a plate spring extending between and mounted on two pivotal shafts relating respectively to said ratchet member and said pawl member, and a lug portion formed on the plate spring for resiliently biassing the pawl member in the direction engaging with the ratchet teeth.

3,998,298

ANTILOCK SENSOR ASSEMBLY

Joseph Edgar Fleagle, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Oct. 28, 1975, Ser. No. 626,500

Int. Cl.² B60T 8/00

U.S. Cl. 188—181 R 7 Claims

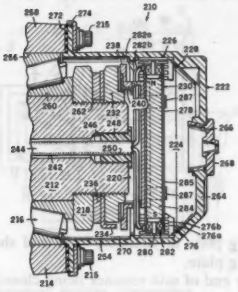
3. A vehicle wheel speed sensor comprising:

a. annular rotor means mounted for rotating adjacent and relative to the axle; and

b. stator means mounted on the axle and including point sensor means having pole pieces 180 degrees diametrically opposed and directed radially outwardly toward and in radial alignment with the annular rotor means for proximate electrical association therewith, the point sensor means including:

1. a plurality of point sensor cartridges;

2. each cartridge having a pole piece exposed at one end thereof;
3. each cartridge having coil means for annular relationship with each pole piece;



4. each cartridge having a magnetic element in abutting relationship with each pole piece; and
5. the pole piece, coil means and magnetic element are encapsulated in relative fixed relationship within the cartridge by a synthetic material.

3,998,299

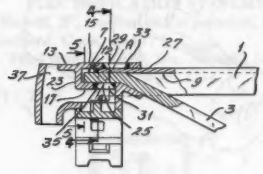
BRAKE BEAM STRUCTURE

Oliver C. Fuller, Hinsdale, Ill., assignor to Evans Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 579,842, May 22, 1975, abandoned. This application Sept. 15, 1975, Ser. No. 613,570

Int. Cl.² B61H *13/36*

U.S. Cl. 188—223.1 **12 Claims**



1. In a railway truss-type brake beam, a compression member comprising a forwardly open channel and a tension member comprising a flat bar the end portions of which are of substantially the same thickness as the rest of the tension member, with their end portions converging toward the ends of the beam, said tension member end portions being received within the end portions of said channel member and projecting slightly longitudinally therefrom, a fillet weld joining the projecting rear surfaces of said tension member to the end surfaces respectively of said channel member web whereby to form an abutment integral with both said channel member and said tension member preventing separation of said tension member from the compression member when the beam is subjected to bending moments during brake applications, an end member mounted on each of said end portions, said end member having spaced top, bottom and rear walls respectively engaging the top, bottom and rear surfaces of said compression member end portion, a window in said rear wall exposing a major part of the portion of the rear surface of said compression member engaged by said rear wall, and a fillet weld along the periphery of said window between said rear wall and the rear surface of said compression member.

3,998,300

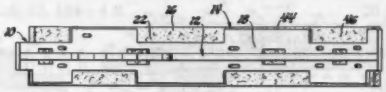
DRUM BRAKE SHOE

William M. Sullivan, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 14, 1976, Ser. No. 676,754

Int. Cl.² F16D *65/08*

U.S. Cl. 188—250 A **3 Claims**



3. A brake shoe mounting support plate formed from flat stock and having opposed ends, opposed sides, and opposed face surfaces, one of said face surfaces being adapted to have brake friction material secured thereto;

said opposed sides having laterally defined recesses and projections alternately spaced along the lengths thereof and adapted to be in nesting relation with the sides of other similarly constructed shoe rims, the width of said face surfaces between said opposed sides being substantially constant.

3,998,301

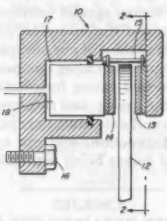
METHOD AND COMPOSITION FOR NON-SQUEAL DISC BRAKE PADS

Norman Bernard Morse, Newton, and David Bruce Lester, Arlington, both of Mass., assignors to Norman B. Morse, Newton, Mass.

Filed Dec. 29, 1975, Ser. No. 644,847

Int. Cl.² F16D *69/02*

U.S. Cl. 188—251 A **2 Claims**



1. A non-squeal automobile replaceable disc brake pad assembly comprising:

a mounting member adapted to fit an automobile braking system and for mounting against a brake pressure member of said braking system;

a first surface of said mounting member being positionable against said brake pressure member,

a coating on said first surface of a soft film polymeric emulsion having a glass transition temperature between the range of about −40° C and about +20° C; and

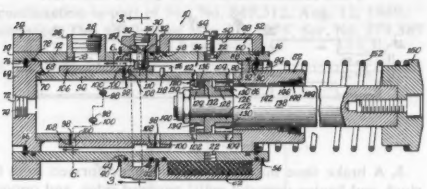
a brake pad integrally mounted on one surface of said mounting member to face away from said brake pressure member and to be pressed against a rotating disc braking member.

3,998,302

ADJUSTABLE SHOCK ABSORBER UNIT

Willard J. Schupner, Palatine, Ill., assignor to Efdyn Corporation, Chicago, Ill.

Filed Aug. 6, 1975, Ser. No. 602,474
Int. Cl.² F16F 9/44, 9/48
U.S. Cl. 188—285 2 Claims



1. In a shock absorber comprising an annular outer casing having a forward end and a rearward end, a pressure tube extending lengthwise within said casing and defining a chamber therebetween, a piston assembly axially movable along an axis within said pressure tube, a piston rod connected to said piston assembly and extending outwardly of said forward end of said casing for receiving impact forces, said pressure tube having at least one radial metering bore formed in the wall thereof which defines an orifice open at the outer surface of said pressure tube, and a metering sleeve surrounding said pressure tube within said casing and having a radial port adjacent said orifice for establishing the effective area thereof, said metering sleeve being axially movable relative to said pressure tube to adjust the position of said port relative to said bore to vary the effective area of said orifice to thereby regulate the flow of fluid outwardly of said pressure tube through said bore and said port to said chamber as said piston assembly moves rearwardly in said pressure tube, the improvement comprising:

said outer casing having a slot therein which slot is elongated in an axial direction, pin means extending through said slot and engaging said metering sleeve, said pin means being movable in the axial direction in said slot and by said engagement with said metering sleeve imparting a corresponding movement to said sleeve, operating means externally of said casing engaging said pin means for moving said pin means axially in said slot and for locking the pin means against unintentional axial movement in said slot, and seal means for preventing fluid loss through that part of the slot not occupied by said pin, said means externally of said casing comprising an adjustment ring mounted on said casing for rotation about said axis with respect to the casing, said ring having a spiral groove on the inside thereof extending only part way through the ring in a radial direction, said pin extending into said groove; said seal means being between said ring and said casing.

3,998,303

SHOE HOLD DOWN RETAINER FOR DRUM BRAKES

Langley H. Wunderlich, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 23, 1976, Ser. No. 660,497
Int. Cl.² F16D 51/18
U.S. Cl. 188—340 4 Claims

4. A brake shoe hold-down assembly comprising:

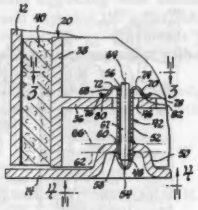
a backing plate having a first aperture therein;

a brake shoe web having a second aperture therein of larger radius than said first aperture;

and a hold-down retainer extending through said apertures and having

a radially spring-yieldable retainer body section formed to provide axially opposed retention barbs which are capable of passing through said larger aperture without interference, said barbs gripping opposite surfaces of said backing plate,

and radially and axially extending and reversely bent spring arms on one end of said retainer and extending axially toward and then axially away from said barbs and engaging the surface of said shoe web opposite said



backing plate to yieldably hold said shoe web to said backing plate,

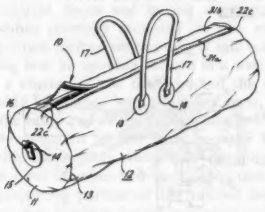
the other end of said retainer being closed so that splash water entry through said first aperture is minimized.

3,998,304

WATERPROOF CONTAINER FOR GOODS

C. Willis Edgerton, Jr., Bryn Mawr, and Lynn L. Copeland, Coatesville, both of Pa., assignors to C. Willis Edgerton, Jr., Bryn Mawr, Pa.

Filed Apr. 21, 1976, Ser. No. 678,913
Int. Cl.² A45C 5/08
U.S. Cl. 190—48 3 Claims



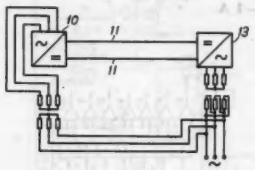
1. A watertight container having wall means of a flexible material, at least one of said wall means having a pair of complementary edge portions confronting one another to provide an opening into the interior of said container, complementary fastening strips extending along said edges and operable to releasably engage each other to provide a releasable mechanical closure for said opening, a flexible tubular portal having opposite ends thereof open, to provide a passageway therethrough, one of said open ends mounted on said side wall means in surrounding relation to said opening and sealed to said side wall means so as to provide a tubular passageway for inserting and removing goods from said container through said opening, said tubular portal operable to be flattened and rolled upon itself to provide a roll of said flexible material along the length of said confronting edges, flap means mounted on said side wall means parallel to said confronting edges, cooperating fastening strips extending along the length of said edges on said flap means and said fastening strips being adapted to be releasably engaged with one another to enclose the rolled-up portal and retain the same in its flattened rolled-up condition to thereby seal the opening in said container against passage of moisture therethrough in either liquid or gaseous form.

3,998,305

ARRANGEMENT IN CURRENT SUPPLY SYSTEMS

Vilmos Torok, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Dec. 12, 1974, Ser. No. 532,209
Claims priority, application Sweden, Jan. 15, 1974, 74004615
Int. Cl.² B60L 9/00
U.S. Cl. 191—5 6 Claims



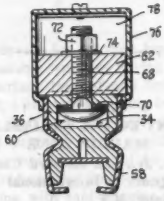
1. A transportation system comprising
a non-railbound vehicle,
an overhead line having two conductors (11),
said vehicle comprising a current collector (12) movably mounted thereon,
said current collector being engageable with said overhead line,
a DC power supply means (10) connected to said conductors for supplying tractive power to said vehicle,
an AC component generating means (10) connected to said conductors for generating an alternating current component therein and thereby an alternating electromagnetic field (B_1,E_2) in the vicinity of said line,
said vehicle having sensing means (16) for sensing said field and control means (15) connected to said sensing means for generating a signal (T) in response to displacement of the current collector in relation to said line.

3,998,306

RAIL CONSTRUCTION FOR RAIL-TYPE ELECTRIFICATION SYSTEMS

Alleyne C. Howell, Jr., c/o Howell Corporation, 1180 Stratford Road, Stratford, Conn. 06497

Filed Aug. 8, 1975, Ser. No. 603,149
Int. Cl.² B60M 1/34
U.S. Cl. 191—23 R 4 Claims



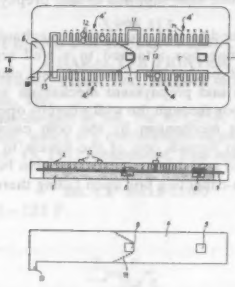
1. A rail construction for rail-type electrification systems, comprising in combination:
a. a pair of rail members having abutting end portions provided with T-slots,
b. a connection strip bridging said abutting end portions,
c. bolts passing into the T-slots of said end portions and through the connection strip, for securing the rail members to each other in end-to-end relation,
d. the heads of said bolts being disposed in said T-slots, and
e. resilient, bowed washer means located in the T-slots under the bolt heads, said washer means being secured to enable it to bow more or less due to unequal expansion and contraction of the bolts as compared with the rail members and connection strip.

3,998,307

PARKING METER

Felix D. Kolben, Ferstelgasse 4, A-1090 Vienna; Franz Hammer, Schwedgasse 29-35, A-1230 Vienna, and George Tauber, Kandlgasse 37, A-1070 Vienna, all of Austria

Filed Apr. 10, 1975, Ser. No. 566,769
Claims priority, application Switzerland, Nov. 15, 1974, 15279/74
Int. Cl.² G07F 1/06
U.S. Cl. 194—4 R 20 Claims



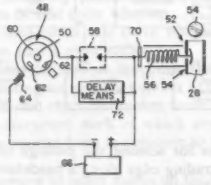
1. A parking indicator comprising:
a casing;
means for indicating the time of commencement of parking, said time indicating means being operably connected to and movable with respect to said casing;
value indicating means insertable into said casing to an operative position whereat said time indicating means is prevented from being further adjusted; and
means associated with said casing and said value indicating means for preventing removal of said value indicating means from said operative position within said casing without destruction of said value indicating means.

3,998,308

COIN-OPERATED TOWEL DISPENSER

Glen E. Yeakley, Westfield, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 6, 1975, Ser. No. 620,192
Int. Cl.² G07F 11/24
U.S. Cl. 194—10 8 Claims



1. A paper towel dispenser for dispensing at least one towel from a towel roll containing a multiplicity of towels, comprising:
a towel cabinet having an outlet opening for dispensing one of the towels from the towel roll therethrough;
rotative means disposed within said cabinet for effecting the withdrawal of one of the towels from said cabinet through said outlet opening;
driving means for operatively engaging said rotating means comprising electric motor means attachable to said driving means for the activation thereof including:

a rotor rigidly attached to said driving means, the rotor having a permanent magnet attached thereto and having an initial position;

at least one electromagnet disposed externally to said rotor and energizable by said contact means so that upon closure of said contact means said rotor is aligned with said electromagnet due to the attraction of said permanent magnet to the energized electromagnet so as to cause said rotor to rotate by at least a fraction of a revolution, said rotor reverting to said initial position upon opening of said contact means;

a prepayment mechanism for releasing said driving means by at least one coin supplied to said prepayment mechanism;

a chute attached to said prepayment mechanism; and

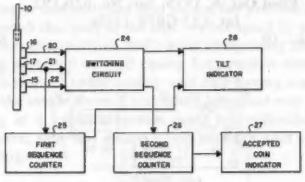
a coin-collecting box attached to a wall separating said prepayment mechanism therefrom, said chute communicating with said prepayment mechanism and said coin-collecting box through the wall whereby operation of said prepayment mechanism by the coin causes the towel dispenser to furnish one of the towels to a user upon activation of said driving means, the coin being collected in said coin-collecting box upon falling thereinto through said chute.

3,998,309

COIN ACCEPTING DEVICE

Peter J. Mandas, Sparks, and Inge S. Telnaes, Reno, both of Nev., assignors to Bally Manufacturing Corporation, Reno, Nev.

Filed Jan. 23, 1976, Ser. No. 651,844
Int. Cl.² G07F 3/02
U.S. Cl. 194—97 R 11 Claims



1. A detector for sensing the passage of a coin having a leading and a trailing edge along a predetermined path, comprising, in combination,

a plurality of sensors spaced along the path with each sensor including signal generating means for indicating the arrival of the leading edge of the coin at the sensor position and passage of the trailing edge of the coin past that sensor position;

means for transmitting said sensor signals in sequence;

means acting in response to the occurrence of said signals for indicating the uninterrupted passage of the coin past the sensors when the signals are in one predetermined sequence; and

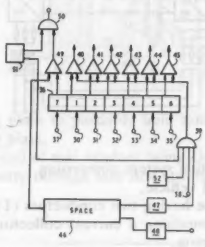
means for indicating the interrupted passage of the coin past the sensors when the signals are in a second sequence.

3,998,310

APPARATUS FOR RECORDING DATA IN ARABIC SCRIPT

Mohammad Saeed Chaudhry, Southampton, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 24, 1974, Ser. No. 508,851
Claims priority, application United Kingdom, Nov. 1, 1973, 50823/73
Int. Cl.² B41J 5/00
U.S. Cl. 197—1 A 6 Claims



4. A keyboard-operated machine for recording data in Arabic script comprising a keyboard, a character-selection mechanism, a case shift mechanism, a store through which the characters of the script can be passed for typing after entry from the keyboard, means to generate a universal gating signal on operating each character key, a gating arrangement controlled by said universal gating signal to gate the stored character out of each store to said character-selection mechanism, means effective for each character having both full and short forms to supply an indication to this effect whereby characters having both full and short forms are distinguished from characters having full form only, a gate controlled by said indication, means effective in respect of each character having both full and short forms to cause the typing thereof from the store in short form when followed by a character and in full form when followed by a space, and a space bar operable to generate a signal through said gate for operating said case shift mechanism, whereby, when said indication is present, said case shift mechanism is operated and the stored character is typed in full form.

3,998,311

INDICATING ENTRY INTO A VARIABLE WIDTH RIGHT MARGIN ZONE

John Charlie Greek, Jr., and Howard Carl Tanner, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 17, 1975, Ser. No. 541,754
Int. Cl.² B41J 19/64, 21/00
U.S. Cl. 197—19 3 Claims

1. A system for indicating entry into a variable width zone adjacent a right margin, said system comprising

a. means for storing an operator selected measure count;

b. means for tabulating a running count of escapement units for characters and spaces with a minimum number of escapement units being tabulated for each space;

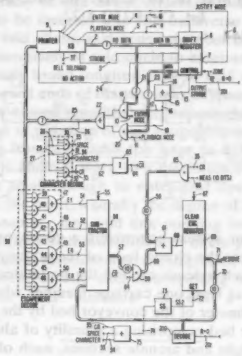
c. means for tabulating a running count of said spaces;

d. means for comparing said escapement unit count with said measure count to determine a residue count;

e. means for calculating a product of said space count and a space expansion constant; and

f. means for indicating entry into said zone defined by:

A. said residue count being equal to, or less than, a predetermined number of escapement units, and



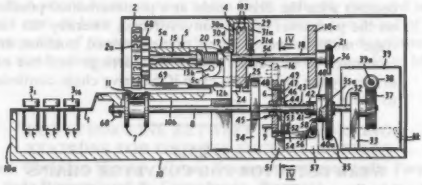
B. said residue count being equal to, or less than, said product.

3,998,312

PRINTING OR STAMPING DEVICE

Yukio Fujimi, Narashino, and Akihiro Miwa, Funabashi, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 26, 1974, Ser. No. 536,401
Claims priority, application Japan, Dec. 28, 1973, 49-908
Int. Cl.² B41J *1/22*
U.S. Cl. 197—55 10 Claims



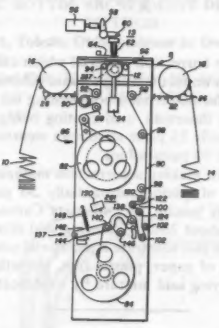
1. A printing device for printing type symbols on a sheet comprising: a rotatable type ring having a plurality of types on the peripheral surface thereof and being fixed on one end portion of a shaft; a pivotable printing lever rotatably supporting thereon said shaft with said type ring being located at a free end of said printing lever; angular positioning means responsive to a coincidence signal for positioning said type ring at a preselected angular position; angular position detecting means coacting with said angular positioning means for detecting successive angular positions of said type ring and providing corresponding position signals; a plurality of actuatable key switches each corresponding to one of said types; means responsive to the actuation of each key switch for developing a corresponding input signal; a coincidence detector receptive of each position signal from said angular position detecting means and of the input signal developed by the actuation of each key switch and operative to detect coincidence of the two corresponding signals and provide an output coincidence signal to thereby enable said angular positioning means to angularly position the type ring; a rotatable cam in camming engagement with said printing lever and effective during rotation thereof to pivot said printing lever to thereby move said type ring toward a sheet to be printed; a one-cycle-operating clutch including a driven member connected to rotate with said cam and a driving member connected to a driving shaft and operative when actuated to its clutched state to rotationally drive said cam; a second clutch self-releasable under over-load and including a driven member connected to rotate with said type ring and a driving member connected to rotate with and movable along said driving shaft; and means including a pivotable trigger lever engageable with said driving member of said second clutch and operative in response to movement of said driving member along said driving shaft when an over-load is caused on the second clutch during positioning of said type ring in a preselected angular position for actuating said one-cycle-operating clutch to its clutched state whereby said cam pivots said printing lever to move said type ring toward the sheet to be printed.

3,998,313

PAPER WEB AND INK RIBBON FEED CONTROL FOR CHARACTER PRINTER

Richard C. Hickey, Plano, Tex., assignor to Docutel Corporation, Dallas, Tex.

Continuation-in-part of Ser. No. 351,558, April 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 297,218, Oct. 13, 1972, abandoned. This application Nov. 22, 1974, Ser. No. 526,420
Int. Cl.² B41J *15/00*
U.S. Cl. 197—133 P 8 Claims



1. In an automatic character printer, comprising in combination:

drive wheels having a plurality of indentations positioned about the circumference thereof,

at least one endless flexible belt having positioning pins extending therefrom to engage feed holes in a receipt form and including positioning buttons engaging the indentations of said drive wheels,

drive means coupled to said drive wheels for moving the receipt form past a print station,

character means located at the print station for printing during a printing sequence a number of characters on the receipt form said character means including a plurality of individual characters each of which are positionable to print on the receipt form in response to a character print signal,

a sensor responsive to index marks on the receipt form and generating a leading index signal and a trailing index signal,

a movement sensor synchronized with the movement of said drive means and generating a receipt form movement signal,

control means responsive to the leading index signal, the trailing index signal and the receipt form movement signal and producing a character print signal when the receipt form has been positioned at the print station, said control means including means responsive to the operation of said character means for generating a signal to shut down the printing sequence when the number of characters printed exceed a given number limit before said index sensor generates the trailing index signal,

means for locating the receipt form at a printing position, said means for locating including a pressure plate at the print station for applying pressure to the receipt form, and

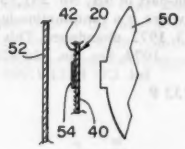
means for forcing the receipt form against said character means to imprint thereon a selected character in response to the character print signal.

3,998,314

IMPACT TYPEWRITER CORRECTION TAPE AND METHOD OF MANUFACTURE

Victor Barouh, 111 Wheatley Road, Old Westbury, N.Y. 11568, and Robert Glenn, 400 E. 56th St., New York, N.Y. 10022

Filed Nov. 13, 1975, Ser. No. 631,567
Int. Cl.² B41J *29/00, 31/00*
U.S. Cl. 197—181 6 Claims



1. A typewriter correction material which comprises a substrate film and an impact coating on said substrate to lift off a typed character formed from a non-wetting ink when pressed into engagement therewith, said coating being a mixture including substantially 25 parts aluminum stearate, 5 parts barium lanolate and 70 parts toluol.

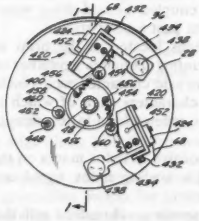
4. A method for making a correction material, which comprises the steps of mixing substantially 50 parts aluminum stearate, 10 parts lanolin and 40 parts Carnauba Wax at a temperature of about 200° F., coating said mixture on a thin substrate wherein said substrate is a material selected from the group consisting of paper, plastic film, polyethylene, acetate or nylon, and drying said mixture by solidification.

3,998,315

ROTOR STRUCTURE FOR ROTARY ELECTRICAL PRINTER

Darwin E. Phillips, Huntsville, Ala., assignor to SCI Systems, Inc., Huntsville, Ala.

Filed Feb. 2, 1976, Ser. No. 654,281
Int. Cl.² G01D *15/18*
U.S. Cl. 197—1 R 19 Claims



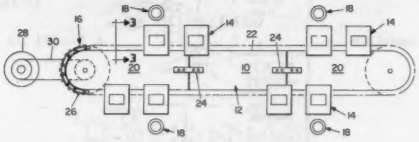
1. In a rotary printer including a stylus, support means for supporting a recording sheet, means for creating rotary motion of said stylus and said support means relative to one another, and stylus positioning means for positioning said stylus near said support means to contact said sheet during said rotary motion, and for positioning said stylus away from said support means when the speed of said rotary motion is below a pre-determined level.

3,998,316

MANUFACTURING MACHINE

Lawrence J. Kamm, 1515 Chatsworth Blvd., San Diego, Calif. 92107

Filed May 10, 1974, Ser. No. 468,760
Int. Cl.² B23Q *5/22*
U.S. Cl. 198—344 8 Claims



1. A conveyor system comprising a conveyor bed whose perimeter defines the closed loop of the conveyor system, a drive chain which extends around the perimeter of the conveyor bed and at least one carriage member which is driven around the perimeter of the conveyor bed by the drive chain,

the conveyor bed comprising a plurality of alternately disposed straight and arcuate sections, each of the straight sections including a vertical plate member,

the drive chain comprising a plurality of roller elements each having a vertical axis of rotation, the drive chain extending around the perimeter of the conveyor bed with the roller elements of the drive chain being in contact with the vertical plate members of the conveyor bed, whereby when the drive chain is driven, the roller elements along the straight sections of the conveyor bed are driven in rotation about their axes by frictional engagement with the vertical plate members,

the carriage member comprising support means for supporting the carriage member from the conveyor bed and means for frictionally driving the carriage member by the drive chain, and

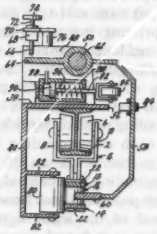
means for disengaging the carriage member from physical contact with the drive chain at a predetermined position on the perimeter of the conveyor bed, whereby the carriage member stops at the predetermined position and continues to be supported by the carriage bed but not driven by the drive chain even if the drive chain continues to move.

3,998,317

WEAR DETECTOR FOR CONVEYOR CHAINS

Arvil L. Stinnett, 712 S. 104th, Edwardsville, Kans. 66111

Filed July 30, 1975, Ser. No. 600,446
Int. Cl.² B65G *43/00*
U.S. Cl. 198—341 10 Claims



1. A wear detector in combination with a conveyor chain the links of which open transversely of the extent of said chain with the ends of the two links adjoining one link disposed in opposed relation across the opening of said one link, whereby wear of the connections between said links is reflected by an increase in the spacing, longitudinally of the chain, between

said opposed ends of the adjoining links, said detector comprising:

a. a base carried in a fixed position adjacent said chain,

b. a gauge member carried by said base for movement transversely of said chain, and being biased toward said chain to be inserted into the transverse opening of one link of said chain, said gauge member being sufficiently thin transversely of said chain to enter said opening, and sufficiently broad longitudinally of said chain to engage the opposed ends of the two links adjoining said one link, said last named breadth being taperingly reduced in the direction of insertion of said gauge member into said link opening from a breadth too large to enter said opening when the chain is worn to a maximum safe degree, to a breadth small enough to enter said opening when said chain is not worn, whereby the degree of insertion of said gauge member into said link opening becomes progressively greater as the wear of said chain progresses, and

c. signal means responsive to the degree of insertion of said gauge member into said link opening to emit a signal whenever said insertion exceeds a predetermined amount.

3,998,318

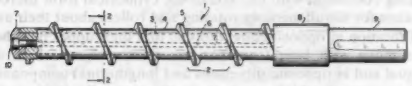
EXTRUDER SCREW

Fred R. McAlarney, Seymour, Ind., assignor to The Pantasote Company, Greenwich, Conn.

Filed Mar. 31, 1975, Ser. No. 563,358

Int. Cl.² B65G *33/08*

U.S. Cl. 198—657 **13 Claims**



1. A screw having a root and a flight helically disposed on said root, at least a segment of the flight being composed of a composite of titanium carbide particles uniformly distributed in a steel matrix and having a Rockwell C hardness of 60 to 66.

3,998,319

CONVEYOR LINE BETWEEN TWO WORKING STATIONS FOR OBJECTS SUCH AS BOTTLES

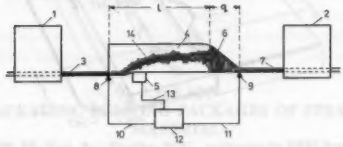
Erik Christian Mernøe, Virum, Denmark, assignor to De Forenede Bryggerier A/S, Copenhagen, Denmark

Filed Feb. 10, 1975, Ser. No. 548,856

Claims priority, application Denmark, Feb. 13, 1974, 748/74

Int. Cl.² B65G *43/08*

U.S. Cl. 198—347 **1 Claim**



1. A conveyor line between two workings stations for objects such as bottles and comprising a single or multi-row buffer section between the discharge conveyor of a preceding working station and the feed conveyor to a subsequent working station and provided with means for currently checking the number of objects present in the buffer section, said means being adapted to adjust the speed of the buffer section conveyor continuously in response to the detected number of objects, wherein the speed V of the buffer section conveyor is controlled as a function of

$$V = \frac{y \cdot l}{x - x_q},$$

wherein y is a constant representing the normal performance of the preceding working station in number of objects per minute, x if the total number of objects in the buffer section, x_q is a constant representing the number of objects queued up waiting their turn to be fed to the subsequent working station, determined by the normal performance of the subsequent working station and filling out the total width of the buffer section, and l is a constant representing the length in meters of the part of the buffer section extending forward of the queue, to the minimum speed required to maintain the number of objects in the queue substantially equal to constant x_q, thereby minimizing noise caused by collision between objects in the buffer section while ensuring an adequate feed of objects for full performance of said subsequent working station.

3,998,320

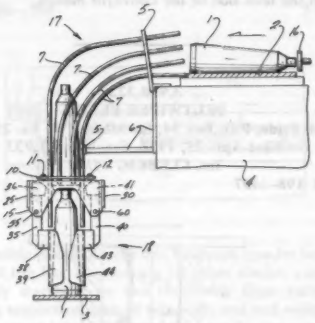
PLASTIC BOTTLE ESCAPEMENT DEVICE AND METHOD

Noel B. Eggert, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 23, 1976, Ser. No. 660,309

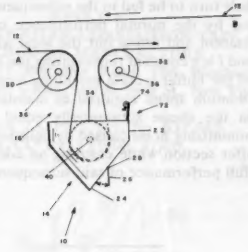
Int. Cl.² B65G *47/06*

U.S. Cl. 198—463 **13 Claims**



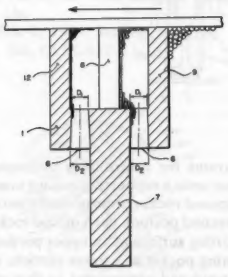
1. An apparatus for controllably dispensing bottles in an upright position onto a supporting surface comprising a pair of oppositely disposed rocker arms pivotally movable from a first position to a second position each of said rocker arms carrying a bottle supporting surface at an upper portion thereof and an inwardly opening pocket at a lower portion, said rocker arms being so arranged and constructed so that when in said first position said bottle supporting surfaces are in a closed bottle supporting position and said pockets are in an open position and when in said second position said bottle supporting surfaces are in an open non-bottle supporting position and said pockets are in a closed position defining a bottle restraining and stabilizing nest; means guiding an upright bottle to a position which is vertically above said supporting surfaces when said rocker arms are in said first position and which is in alignment with the bottle stabilizing nest defined by said pockets when said rocker arms are in said second position; and means for pivotally moving said pair of rocker arms between said first and second positions.

3,998,321
CONVEYOR WASH DEVICE
Edward D. Schultz, 2306 Cherry Ridge Lane, Brandon, Fla. 33511
Filed Sept. 15, 1975, Ser. No. 613,485
Int. Cl.² B65G 45/00
U.S. Cl. 198—495 16 Claims



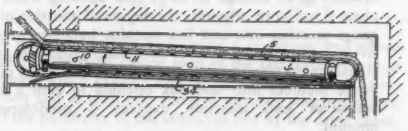
1. A conveyor wash device for use with a conveyor transport system to recover particulate material adhering to the return side of the conveyor means of the conveyor transport system; said conveyor wash device comprising a fluid wash basin configured to retain fluid therein to remove the particulate material from the conveyor means, a plurality of conveyor wash rollers disposed to route the return side of the conveyor means through the fluid of said fluid wash basin and a particulate recovery means disposed in operative communications with said fluid wash basin and the feed side of the conveyor means to transport particulate material from said fluid wash basin to the feed side of the conveyor means.

3,998,322
BELTWIPER BLADE
D. R. McBride, P.O. Box 94, St. Albans, W. Va. 25177
Filed Apr. 25, 1975, Ser. No. 571,733
Int. Cl.² B65G 45/00
U.S. Cl. 198—497 4 Claims



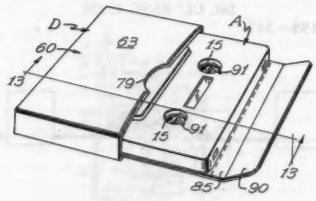
1. A conveyor belt cleaner blade comprising:
a. A base
b. At least three rows of teeth permanently mounted on said base, said teeth being further arranged such that the teeth of one row oppose the space between the teeth of the adjacent row; and
c. A plurality of holes through the base, said holes being located between the rows of teeth, said holes forming a truncated cone the diameter of the opening at the top of the base being smaller than the opening at the bottom of the base.

3,998,323
CONVEYING APPARATUS FOR HEAT TREATMENT FURNACES
Rolf Schuster, Hanau, Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany
Continuation of Ser. No. 417,598, Nov. 20, 1973, Pat. No. 3,905,472. This application Aug. 29, 1975, Ser. No. 609,156
Claims priority, application Germany, Dec. 4, 1972, 2259300
The portion of the term of this patent subsequent to Sept. 16, 1992, has been disclaimed.
Int. Cl.² B65G 23/00
U.S. Cl. 198—835 3 Claims



1. Conveying apparatus for conveyance of conveyer belts, wire link straps, conveyer boxes or the like in a heat treatment furnace, comprising a pair of similar cylindrical rollers defining a single conveying path, means mountng said rollers in generally longitudinally coextensive relation for rotation about axes disposed within a generally horizontal plane in converging relationship with respect to one another in the direction of the conveying path at an acute angle in the range of magnitude of 1° to 15°, the axes of rotation of each roller being coexistent with the axis of the cylindrical form thereof, means for simultaneously rotating said rollers about their axes of rotation in opposite directions so that their upper peripheries move with lateral components of movement which are equal and in opposite directions and longitudinal components of movement which are both in the same direction, and a single endless flexible means encircling both of said rollers including an upper flight engaging the upper periphery of said rollers and a return flight below said rollers.

3,998,324
TAPE CASSETTE HUB RETAINERS
Harry I. Roccaforte, Western Springs, Ill., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.
Division of Ser. No. 528,270, Nov. 29, 1974, Pat. No. 3,931,889. This application Oct. 28, 1975, Ser. No. 626,211
Int. Cl.² B65D 85/672, 15/50
U.S. Cl. 206—387 7 Claims



1. A tape cassette carton having an integral hub retainer, said carton made from foldable paperboard or similar sheet-like material, said carton comprising:
opposed, rectangular cover panels arranged in parallel spaced relation;
said cover panels connected by opposed side and end wall panels to form a tubular, six-sided carton;
a flat base panel foldable into juxtaposition with the inside surface of one of said cover panels;
at least one die cut, hinged tab means formed in said base

panel and spaced in said base panel to underlie at least one of the hubs in a tape cassette, said tab means foldable outward from the plane of said base panel for engaging and retaining the hubs of said tape cassette when in said carton;

said tab means comprising a generally rectangular shape having three sections formed as a part thereof including a center section of generally triangular shape having as its base a hinge line connecting said post means to said base panel; and

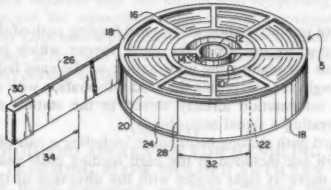
said three sections including a side flap hingedly connected to each of the two remaining sides of said center section, said three sections folded outwardly from the plane of said base panel into at least a frustum of a pyramid to engage and retain said hub of said tape cassette when in said carton.

3,998,325

REEL BAND AND METHOD OF USING SAME

Thomas S. Kulka, 2108 Payne Ave., Cleveland, Ohio 44114

Filed Jan. 2, 1976, Ser. No. 646,176
Int. Cl.² B65D *85/67, 85/671*
U.S. Cl. 206—400 **8 Claims**



1. A device for preventing the unwinding of film wound on a reel, said film having an outer convolution terminating in a free end, comprising

a band of electrostatically charged synthetic material capable of being wrapped at least partially around the outer convolution of said film and covering said free end, whereby said band will cling electrostatically to said outer convolution of film and prevent motion of said free end relative to said outer convolution.

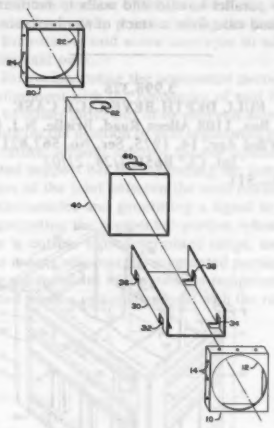
3,998,326

PACKAGING FORMING PACKAGES OF STRAND MATERIAL

Roger H. McKee, Jr., Shelby, N.C., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 29, 1976, Ser. No. 653,321
Int. Cl.² B65D *85/67, 85/04*
U.S. Cl. 206—407 **9 Claims**

1. A container for transporting a forming package of strand material comprising: a tray having a plurality of apertures therein for receiving said forming package, one or more bands surrounding said forming package and tray and being located within a pair of opposing apertures, a pair of end caps covering the ends of said forming package and having means for frictionally engaging a covering tube, and a covering tube



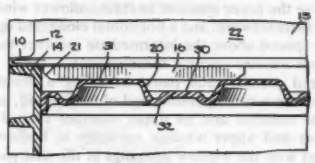
frictionally engaging said end caps and covering said end caps, said tray, and said forming package.

3,998,327

NESTABLE PLASTIC CARRYING AND STACKING CASE

Theodor M. Box, 1108 Aileen Road, Brielle, N.J. 08730

Continuation of Ser. No. 125,716, March 18, 1971, abandoned. This application Dec. 5, 1975, Ser. No. 637,984
Int. Cl.² B65D *21/02, 1/22*
U.S. Cl. 206—508 **5 Claims**



1. A nestable plastic storage and transport case for beverage bottles and the like for stacking on other similar cases and being easily stackable on and removable from such cases comprising respective pairs of side walls and end walls and a bottom structure joined thereto, and a top having supporting means thereon, said supporting means including a plurality of upstanding bosses, integrally formed separator means disposed within said case and supported by said side and end walls to form a plurality of bottle receiving compartments therein, a top peripheral supporting lip and a bottom peripheral supporting lip having a bottom surface, said lips being formed around the top and bottom circumference of the case respectively, said lips being perpendicular to the end and side walls and providing vertical support for the upper case during the stacking of said cases, corner supporting slabs formed in, and projecting outwardly from, said bottom of the case at each corner of said case, said slabs each being disposed inwardly from said bottom supporting lip and having sides parallel to and aligned with the interior of the side and end walls and a downwardly presented support surface disposed below the bottom surface of the bottom lip and oriented parallel to said bottom surface, said supporting surface being sized to engage a plurality of said bosses for providing direct bearing contact between said slab and top supporting means of another case to provide vertical support to the stacked cases and to permit

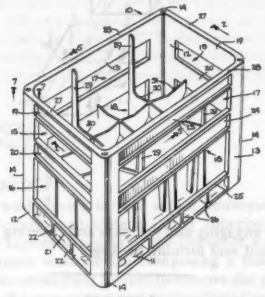
nesting of the slabs within the walls of two similar vertically stacked cases, said slabs each having bevelled bottom edges substantially parallel to said end walls to facilitate end wise removal of said case from a stack of similar cases.

3,998,328

FULL DEPTH BEVERAGE CASE

Theodor M. Box, 1108 Aileen Road, Brielle, N.J. 08730

Filed Apr. 14, 1975, Ser. No. 567,821
Int. Cl.² B65D *1/24, 21/02*
U.S. Cl. 206—511 **3 Claims**



1. A unitary molded plastic full depth rectangular beverage case comprising:

a flat bottom formed of spaced criss-cross intersecting strips;

two side panels, each panel including a horizontal elongated lower member joined to a corresponding side of the bottom, a horizontal elongated intermediate member spaced above the lower member to create a lower window opening therebetween, and a horizontal elongated upper member spaced above the intermediate member to create an upper window opening therebetween;

two end panels, each panel including a lower member joined to a corresponding end of the bottom, an intermediate member and an upper member spaced to create lower and upper window openings in horizontal alignment with the window openings in the side panels;

hollow corner column members of approximately triangular cross section rigidly joining adjacent ends of each side panel and end panel, said column members forming the ends of the upper and lower window openings of the side and end panels;

a continuous upper stacking rim formed by the tops of the upper side and end panel members and the tops of the corner column members;

spaced protrusions on the exterior of said bottom arranged in rows to define lateral channels therebetween, said lateral channels being approximately twice the width of said upper stacking rim and adapted to lockingly engage the upper stacking rims of two other cases when said case is stacked in criss-cross fashion thereupon, the protrusions being inset from the side and end edges of the bottom to provide a lower stacking rim around the margin of said bottom that is congruent with said upper stacking rim; and

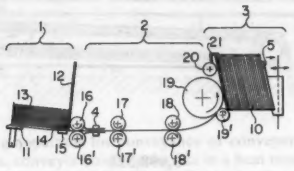
spaced longitudinal and lateral integrally formed partitions within said case for dividing the interior into a predetermined number of bottle-receiving compartments, the lateral partitions nearest the lateral channels defined between said rows of bottom protrusions having rib-like portions at each end extending upwardly from the bottom and terminating below the top of the respective side panels, to avoid interference with the bottom protrusions of another case stacked thereabove, and integrally attached to the lower, intermediate, and upper members of said side panels, said ribs providing both vertical and lateral support to the tops of the side panel upper members to resist crushing thereof when a plurality of cases are stacked in criss-cross arrangement, without obstructing the view of bottles in the interior of the case.

3,998,329

CARD SORTING APPARATUS

Kenzo Araya, and Takashi Hashimoto, both of Tokyo, Japan, assignors to Tanaka Seiki Co., Ltd., Tokyo, Japan

Filed June 5, 1975, Ser. No. 584,114
Claims priority, application Japan, June 26, 1974, 49-72232
Int. Cl.² B65G *47/34*
U.S. Cl. 209—74 M **5 Claims**



1. A card sorting apparatus wherein a card is fed one by one from a card hopper, information included on the card is read at a card sensing stage provided along a card feeding path and the card with a specified information is selected which comprises:

a. a card reading station at the card feeding path of the card fed one by one from the card hopper which includes means for reading the information on the card fed therethrough, for comparing the read information with a specified information already stored in the station and for generating a signal accordingly,

b. a card path shifting mechanism including a pair of rollers which are included at the card feeding path and which can move at right angles with the direction of the card feeding path, holding the card therebetween, being arranged after the card reading station along the card feeding path for shifting its position from a first position to a second position, the first position corresponding to a first path of the card being shifted and the second position to a second path of the card, and the width between the two paths being less than that of the card when forwarded,

c. means for driving the card path shifting mechanism from its first position to the second position in response to the signal from the card reading station, comprising an electromagnetic device which moves an armature when it receives the signal from the card reading station and a mechanism which moves said pair of rollers in response to the movement of the armature,

d. a card stacker which receives and stacks the card in the order as it is received, and

e. a card feeder which feeds the card one by one into the card stacker holding the card as shifted either in the first path or in the second path.

3,998,330

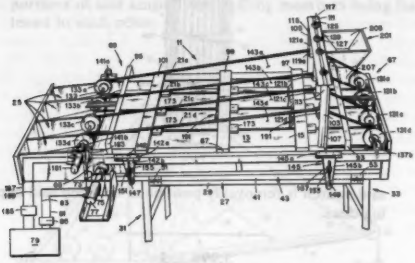
SIZING APPARATUS

Arthur H. Morgan, 4622 Hilltop Road, SW., Knoxville, Tenn. 37920

Filed Dec. 10, 1975, Ser. No. 639,424
Int. Cl.² B07B *1/15*
U.S. Cl. 209—91 **7 Claims**

1. Apparatus for separating objects according to size comprising conveyor means including an elongated supporting surface, means for positioning said supporting surface with its transverse dimension at a slope to the horizontal, endless

conveyor belt means having a run supported on said surface for movement therealong from one end of said supporting surface to the opposite end of said supporting surface, means for driving said conveyor belt means at a predetermined speed; a plurality of endless sizing belts arranged in side-by-side, spaced-apart relationship, each sizing belt having a run which extends generally longitudinally of said supporting surface, said sizing belt runs being disposed above and being substantially parallel to said supporting surface, the distance between each of said sizing belt runs and said supporting



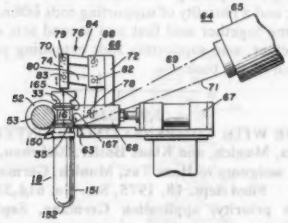
surface varying from a maximum distance adjacent the uppermost side of said conveyor means to a minimum distance adjacent the lowermost edge of said conveyor means, means for driving said sizing belts at a predetermined speed, means for depositing the objects to be sized on said endless conveyor belt means adjacent said one end of said supporting surface and adjacent the uppermost edge of said conveyor means along said slope and a plurality of discharge channels located transversely across said conveyor belt means at said other end of said supporting surface.

3,998,331

METHOD AND APPARATUS FOR HANDLING AND TRIMMING BLOW MOLDED ARTICLES

Joseph R. Reilly, Naugatuck, and Lars G. Schon, Bloomfield, both of Conn., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 467,378, May 6, 1974, Pat. No. 3,894,454.
This application Feb. 18, 1975, Ser. No. 550,537
Int. Cl.² B07C 5/34
U.S. Cl. 209—111.5 **3 Claims**



1. In apparatus for handling and segregating molded plastic articles at elevated temperature having contoured moil portions adjacent one end, the improvement comprising:

A. a rotary mounted elongated screw conveyor and adjacent, segmented support bar substantially aligned opposite said conveyor forming a path for said articles between them, said segmented portion of the support bar and contoured moil portions having cooperating complementary projections for supportive engagement during traversal of such path, said screw conveyor having a root portion contoured to snugly cooperate with said contoured moil portions such that the screw conveyor and complementary portion of the bar form the sole support for the articles as they proceed along the path;

B. means for rotating said screw conveyor to advance articles along said path;

C. means for reciprocating the segmented portion into and out of alignment with the remainder of said bar to allow articles to either move out of or proceed along said path depending on the position of said segmented portion; and

D. temperature sensing control means upstream of the segmented support bar for measuring the temperature in the region of the joint between the moil portions and the rest of the articles and generating a signal to the means for reciprocating the segmented portion when such temperature is outside a predetermined range; and

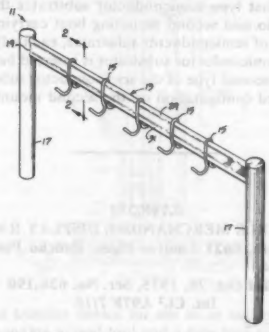
E. hammer means adjacent the segmented portion for forcibly urging articles out of the path on reciprocation of the segmented portion out of alignment with the remainder of the bar.

3,998,332

POT RACK

Theodore C. Lambertson, 1369 Rollins Road, Burlingame, Calif. 94010

Filed Nov. 3, 1975, Ser. No. 627,952
Int. Cl.² A47F 7/00
U.S. Cl. 211—13 **8 Claims**



1. A method of making a pot rack of the kind in which a plurality of pot hooks are mounted on a horizontally extending rack member and comprising,

pressing a tube length to a generally flat shaped rack member having two side wall sections and two peripheral edge portions,

supporting the flattened tube rack member substantially horizontally from end-to-end and with the side wall sections extending substantially vertically from a lower edge portion to an upper edge portion,

forming, along each peripheral edge portion of the flattened tube rack member, a longitudinally extending hollow flange having laterally spaced apart interior surfaces to provide structural rigidity to the rack, and

mounting pot hooks on the flattened tube rack.

3,998,333

CARRIER FOR PROCESSING SEMICONDUCTOR MATERIALS

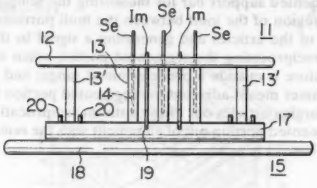
Hiroshi Kamada, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed June 13, 1975, Ser. No. 586,807

Claims priority, application Japan, June 24, 1974, 49-74073[U]

Int. Cl.² A47G 19/02; F27B 9/00

U.S. Cl. 211—41 4 Claims



1. A carrier for processing semiconductor materials which comprises;

a first removable mounting boat having a plurality of supporting branches vertically extending from a main frame thereof, a plurality of grooves being provided at a equidistance at the edge portions of the bottom of said supporting branches so as to sustain a first type of semiconductor substrates thereon,

a second mounting boat having a pair of elongated supporting members provided in parallel on a main frame thereof which have a plurality of grooves provided at an equidistance so as to sustain a second type of semiconductor substrates thereon, and

pairs of fixing means provided on said elongated supporting members of the second mounting boat for fixing at least a pair of supporting branches of the first mounting boat, whereby when the first removable mounting boat carrying the first type semiconductor substrates thereon are coupled to said second mounting boat carrying the second type of semiconductor substrates, each adjacent first type of semiconductor substrates is inserted between two adjacent second type of the semiconductor substrates in a juxtaposed configuration on the second mounting boat.

3,998,334

FLEXIBLE MERCHANDISE DISPLAY RACK

Lloyd D. Smith, 6621 Lautrec Place, Rancho Palos Verdes, Calif. 90274

Filed Oct. 28, 1975, Ser. No. 626,190

Int. Cl.² A97F 7/16

U.S. Cl. 211—45 14 Claims

1. A merchandise display rack for displaying the front side of a swatch of flexible material comprising:

a shaft,

a pair of spaced-apart discs each rotatably positioned on said shaft,

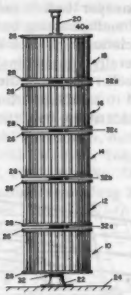
a shoulder portion located on the periphery of each disc positioned to face each other,

a plurality of posts equally spaced between said discs,

each of said posts having end portions fixedly attached to corresponding portions near the periphery of said discs whereby said assembly comprising the discs and attaching posts are rotatable about said shaft, and

a swatch of flexible material having end portions folded about at least one of said posts and inserted towards said shaft for displaying the front side of the swatch,

said swatch having a width that is less than the distance between said spaced-apart discs but greater than the distance between opposing shoulder portions whereby



said swatch is removably positioned between said opposing discs.

3,998,335

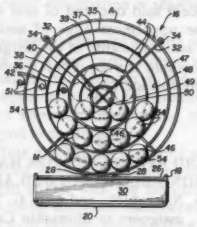
DISPLAY RACK

Khaled A. Rodolpho, 1047 N. Edgewood, Arlington, Va. 22310

Filed Sept. 16, 1975, Ser. No. 613,792

Int. Cl.² A47F 5/14

U.S. Cl. 211—49 D 5 Claims



1. A display rack comprising, in combination, a rearwardly inclined supporting base, a first set of concentric rods mounted on said base substantially normal to the inclination thereof; a second set of concentric rods mounted on said base parallel with and spaced rearwardly of said first set; a plurality of bracing rods joining said second set of concentric rods together; and a plurality of supporting rods extending between and joining together said first and second sets of concentric rods together, said supporting rods extending parallel to the inclination of the base.

3,998,336

CRANE WITH COMPENSATING COUNTERWEIGHT

Hans Tax, Munich, and Klaus Hosler, Eichenau, both of Germany, assignors to Hans Tax, Munich, Germany

Filed Sept. 18, 1975, Ser. No. 614,355

Claims priority, application Germany, Sept. 27, 1974, 2446358

Int. Cl.² B66C 23/72

U.S. Cl. 212—48 9 Claims

1. A crane comprising:

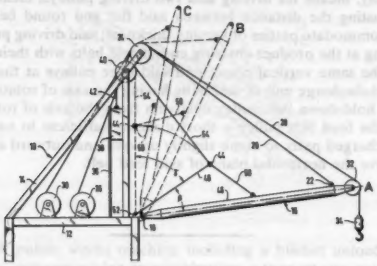
a. a vertically extending support;

b. an elongated boom having two longitudinally terminal portions;

c. pivot means securing one of said terminal portions to said support for angular movement about a substantially horizontal axis;

d. suspending means for suspending a load from the other terminal portion of said boom;

e. moving means for moving said boom angularly about said pivot axis;
f. first and second elongated tension transmitting members having each a first and a second longitudinal end portion, said second tension transmitting member being pliable;
g. first securing means securing the first end portion of said first tension transmitting member to said support;
h. second securing means securing the first end portion of said second tension transmitting member to said boom at a point remote from said pivot means, the second end portions of said tension transmitting members being fastened to each other;



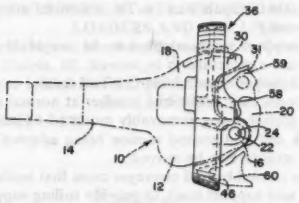
i. a counterweight mounted on said support for vertical movement;
j. force transmitting means operatively interposed between said counterweight and said boom for exerting torque on said boom in response to force of gravity acting on said counterweight, said force transmitting means including an elongated force transmitting member attached to said fastened second end portions; and
k. guide means upwardly spaced on said support from said pivot axis and engaging said force transmitting member, said force transmitting member being connected to said counterweight for urging said fastened second end portions toward said guide means under said force of gravity.

3,998,337

COUPLER DOUBLE SHELF COLLAR

Russell George Altherr, Munster, Ind., assignor to Amsted Industries Incorporated, Chicago, Ill.

Filed Aug. 4, 1975, Ser. No. 601,520
Int. Cl.² B61G *3/00*
U.S. Cl. 213—153 **1 Claim**



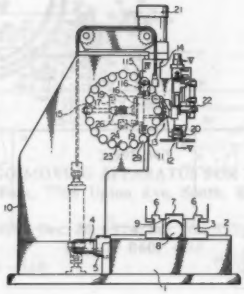
1. A collar adapted to be secured to the head of a noninterlocking type E railway car coupler including a head, a knuckle pivotally mounted in pivot lugs having aligned openings to receive a pivot pin, and a guard arm, the pivot lugs and guard arm defining a recess adapted to receive the knuckle of a mating coupler, said collar comprising a unitary rigid structure having a guard arm leg and a knuckle side leg interconnected by upper and lower straps, a shelf on said upper strap extending above the head and at least partially overlying said recess, a shelf on said lower strap extending below the head and at least partially underlying said recess, and a forwardly extending opening in the knuckle side leg adapted to receive the guard arm nose of a mating A.A.R. F type coupler, said collar being capable of resisting a full vertical load transmitted by a mating coupler.

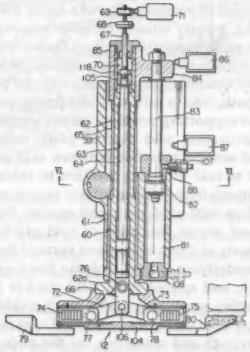
3,998,338

AUTOMATIC TOOL CHANGING APPARATUS

Noboru Suzuki, Ama, and Yozi Kamiya, Anjo, both of Japan, assignors to Toyoda Machine Works, Limited, Japan

Division of Ser. No. 387,002, Aug. 9, 1973, Pat. No. 3,893,227.
This application Mar. 7, 1975, Ser. No. 556,473
Claims priority, application Japan, Aug. 31, 1972, 47-87368
Int. Cl.² B23Q *3/157*
U.S. Cl. 214—1 BC **3 Claims**





1. A tool transfer device for use in an automatic machine tool for changing a used tool and a new tool comprising:
a slideable sleeve;
a body having means for mounting the slideable sleeve on the machine tool;
a main arm fixedly mounted on said slideable sleeve and provided with a first and second pawl means, said first pawl means for grasping the used tool and said second pawl means for grasping the new tool;
a first power means operable to actuate said first and second pawl means to grasp said new and used tools;
a connecting means connecting said first power means to said pair of pawl means for simultaneously actuating said pair of pawl means in response to the operation of the first power means, said connecting means comprising a pair of slide members slidably mounted in said main arm to be operably connected to said pair of pawl means, a pair of pivotal connecting members pivotably connected

to said pair of slide members, and a further pivotal connecting member having one end pivotably connected to both said pair of pivotal connecting members, and;

a second power means for rotating said slideable sleeve with said pair of pawl means so as to interchange the positions of said used and new tools grasped by said pawl means.

3,998,339

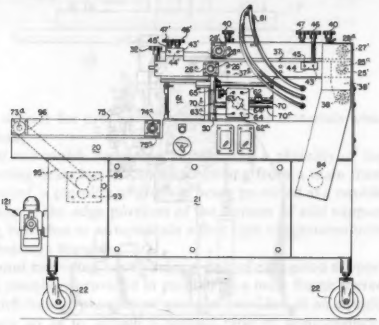
PATTY STACKER

Raymond E. Booth, Huron, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Continuation of Ser. No. 427,703, Dec. 26, 1973, abandoned. This application Aug. 15, 1975, Ser. No. 604,996

Int. Cl.² B65G *57/14*

U.S. Cl. 214—6 D **9 Claims**



1. A patty stacker comprising a frame; means on said frame for carrying a series of patties or the like along a linear path to a discharge point; a patty sensing member adjacent said path, a single stacker plate supported on said frame for reciprocating between a substack supporting position, below said discharge point and extending horizontally beyond the discharge point of said path, and a substack dropping position withdrawn from said supporting position; means supported by said frame for reciprocating said stacker plate responsive to a signal from said sensing member between said positions and sufficiently fast to said dropping position to release said substack with substantially no tilting effect; means supported by said frame in line with said path and spaced from said discharge point and above the level of said stacker plate for stopping each patty in a predetermined vertical line; a finished stack support underlying a stack volume fixed on said frame directly beneath, and spaced from, said stacker plate in said substack supporting position; parallel stack guides carried by said frame and spaced on opposite sides of said support parallel to said linear path and extending for the major part of the distance from said support to said stacker plate in said substack supporting position; movable door means at least partially closing the space between said stack guides in the downstream direction; pusher means carried by said frame and having a vertical face at least substantially of minimum patty width normally positioned in the spaces between said stack guides on the upstream side of said support completing a stack volume; means for reciprocating said pusher from said normal position sufficiently to push a stack of patties from said support through said door means; means beyond said door means at the level of said support to receive a stack propelled by said pusher; and adjustable electromechanical counting and stepping switch control means responsive to said patty sensing member for causing the counting and stacking of a plurality of patties of a set number, more than two, on said stacker plate in a first substack which is reasonably stable, for then operating said stack plate reciprocating means to drop said first substack on said support, for then causing the counting and stacking of at least a second substack of a plurality of patties on said stacker plate and again operating said stacker plate reciprocating means to drop said second substack upon said first substack, and for continuing said counting, stacking and dropping until a finished stack of predetermined selected number is formed, and for then actuating said means for reciprocating said pusher to push said finished stack through said movable door means, and wherein said means for carrying said patties along a linear path comprises a lower flat endless belt extending over a drive pulley and an idler pulley and an upper endless round hold-down belt parallel to and approximately above the centerline of said flat belt; said round belt extending over a grooved drive pulley and a grooved idler pulley; means for driving said two driving pulleys; means for adjusting the distance between said flat and round belts to accommodate patties of varying thickness; said driving pulleys being at the product-entering end of said belts with their axes in the same vertical plane; and said idler pulleys at the product-discharge end of said belts having the axis of rotation of the hold-down belt pulley upstream from the axis of rotation of the feed belt pulley a short distance sufficient to cause a discharged patty to climb slightly upward and outward a little above the horizontal plane of said feed belt.

3,998,340

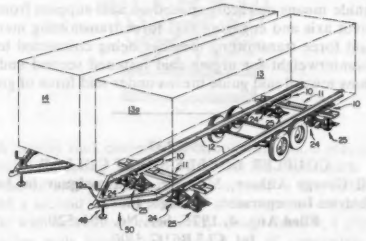
CONVEYOR CROSS

Gordon L. Westwood, 968 N. 2nd East, Orem, Utah 84507

Continuation of Ser. No. 380,152, July 18, 1973, abandoned. This application May 12, 1975, Ser. No. 576,789

Int. Cl.² B65G *13/00*

U.S. Cl. 214—38 C **7 Claims**



1. Apparatus to provide simultaneous transverse and longitudinal movement capabilities to a structure supported thereon comprising

a portable support track adapted to be removably positioned below a structure to be moved;

a portable conveyor cross having first and second conveyor sections connected across one another at normal angles, said first section being removably mounted on said support track and said second section being adapted to receive the structure to be moved;

roller means carried by said conveyor cross first section and engaging said support track to provide rolling support to said conveyor cross traveling over said support track;

roller means associated with said conveyor cross second section to receive a portion of said structure to be moved thereon whereby the structure can be moved over the rollers with respect to the conveyor cross; and

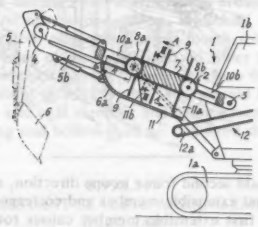
portable support means arranged below said support track as a support between the ground and said support track undersurface, said support means including means for adjusting the vertical level of said support track and the conveyor cross carried thereby and for moving into and out of engagement with said support track.

3,998,341

PUBLIC WORKS MACHINE EQUIPPED WITH A BUCKET UNLOADING DEVICE

Didier Albert Wolf, Meaux, France, assignor to Societe Anonyme: Poclain, Le Plessis-Belleville, France

Filed Dec. 26, 1974, Ser. No. 536,403
Claims priority, application France, Jan. 22, 1974, 74.2129
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B65G *47/00*
U.S. Cl. 214—90 R 3 Claims



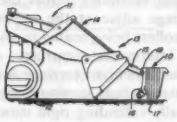
1. A public works machine including a bucket unloading device, and comprising, in combination, a support structure, a jib having first and second opposite ends and articulted on said structure at said first end, a balance beam articulated on said second end of said jib, said balance beam having a free end, a backhoe bucket pivotally mounted on the free end of said balance beam, an endless conveyor movably mounted on said jib and extending along a part of its length adjacent the first end of the jib, said endless conveyor having upper and lower flights which, during movement of the conveyor, respectively move along the jib in the direction towards the second end of the jib for said upper flight and in the reverse direction for said lower flight, said endless conveyor including transverse blades extending generally perpendicularly therefrom and being distributed regularly over the whole of its length, said jib including a chute mounted thereon enclosing a portion of the lower flight of said conveyor, said chute having a pair of opposite open ends which allow the lower flight of the endless conveyor and the blades thereon to pass therethrough, and said bucket having an open end and a cross-section which is substantially identical to that of said chute and is adapted to be placed in position by the balance beam in alignment with said chute with its open end adjacent the chute and facing towards the first end of the jib, whereby the chute-bucket assembly may be swept completely by said blades.

3,998,342

COUNTERWEIGHT ATTACHMENT MEANS FOR LOADERS AND THE LIKE

Jimmy D. Myers, Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 22, 1975, Ser. No. 643,430
Int. Cl.² E02F *3/00*
U.S. Cl. 214—142 10 Claims



1. Counterweight structure for use in counterbalancing earthmoving apparatus comprising:

a weight;

first mounting bracket means fixedly associated with said weight;

second mounting bracket means having a configuration differing from that of said first bracket means and fixedly associated with said weight to extend away from said first mounting bracket means;

a first support adapted to be mounted to an earthmoving apparatus and removably support said first mounting bracket means;

a second support adapted to be mounted to the earthmoving apparatus at a position spaced from said first support and removably support said first mounting bracket means; and

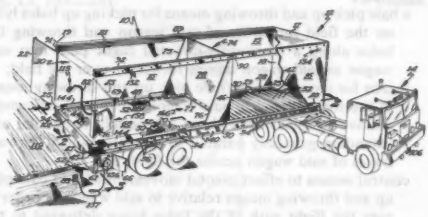
a transfer support adapted to be carried by a removable portion of the earthmoving apparatus and removably support said second mounting bracket means.

3,998,343

CARGO MOVING APPARATUS FOR TRUCKS

Vernen E. Fors, 7708 Upton Ave. South, Richfield, Minn. 55423

Filed Dec. 30, 1974, Ser. No. 537,605
Int. Cl.² B60P *1/38*
U.S. Cl. 214—518 13 Claims



1. In combination with a truck trailer having a pair of upright, lateral, generally parallel sidewalls extending fore and aft along said trailer and a cargo loading entrance at the rear of said trailer, a cargo moving apparatus compatible with wheeled loading vehicles and usable with a power source comprising:

a pair of rigid, elongated members spaced from one another and generally parallel to each other and to said sidewalls;

a multiplicity of rigid, elongated, combined drive and support rollers rotatably mounted to and along the entire length of said pair of members for rotation about the longitudinal axes of said rollers, said rollers having their longitudinal axes parallel to one another, perpendicular to said pair of elongated members, and said longitudinal axes being substantially within a common plane;

a conveyor belt supported by said multiplicity of rollers and mounted on said rollers for movement in fore and aft directions along said trailer in response to rotation of said plurality of rollers, said conveyor belt, said pair of elongated members and said multiplicity of rollers defining a movable load-supporting floor for said trailer on which wheeled vehicles can enter and leave the trailer; and

drive means energizable from the power source and operatively, drivingly connected with said conveyor belt and with said multiplicity of said rollers of said load-supporting floor to positively drive said rollers and move said conveyor belt in fore and aft directions on said rollers to carry cargo along said truck trailer.

3,998,344

BALE WAGONS

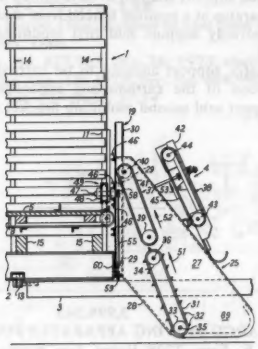
Josef Pellen, Mulgrave, Australia, assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 28, 1973, Ser. No. 345,628

Claims priority, application Australia, Apr. 4, 1972, 8488/72

Int. Cl.² B60P 1/36

U.S. Cl. 214—520 4 Claims



1. A bale handling implement, comprising:

a mobile bale wagon being moveable in a forward direction of travel across a field and capable of supporting a load of bales;

a bale pick up and throwing means for picking up bales lying on the field forwardly of said wagon and throwing the bales along a rearwardly-directed flight path into said wagon as said wagon travels forwardly over the field;

means for mounting said bale pick up and throwing means to the forward end of said wagon for pivotal movement relative to said wagon about a generally horizontal axis extending generally parallel to the direction of forward travel of said wagon across the field; and

control means to effect pivotal movement of said bale pick up and throwing means relative to said wagon in order to vary the flight path of the bales being delivered to the wagon by said bale pick up and throwing means and thereby provide even lateral distribution of bales in said wagon.

3,998,345

SIDE LOADER FOR FORK LIFT TRUCKS

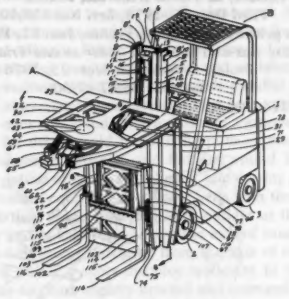
Raymond H. Fiehler, Kirkwood; Thomas E. Quick, Florissant, and Kenneth A. Frees, St. Charles, all of Mo., assignors to Missouri Research Laboratories, Inc., St. Louis, Mo.

Continuation of Ser. No. 458,204, April 5, 1974, abandoned. This application June 2, 1975, Ser. No. 582,833

Int. Cl.² B66F 9/16

U.S. Cl. 214—701 P 15 Claims

1. A side loader for use with fork lift trucks comprising a first support frame, a second frame, means for mounting said second frame on said first frame and for providing swingable movement of the latter about a vertical axis, a reach apparatus mounted on said second frame for extending and retracting movement along an axis normal to the swing axis of said second frame, said reach apparatus having a normally outer end, and a fork bar support frame carried upon said outer end of said reach apparatus; said means including first and second control linkages, each having one end pivotally secured to said first frame and each having an opposite end pivotally secured to said second frame, first and second selectively extensible elongated members having one end pivotally connected to said first and second control linkages respectively and the opposite ends thereof pivotally connected to said first frame whereby extension of said first extensible member and corresponding retraction of said second extensible member causes



rotation of said second frame in one direction, and extension of said second extensible member and corresponding retraction of said first extensible member causes rotation of said second frame in the direction opposite said one direction.

3,998,346

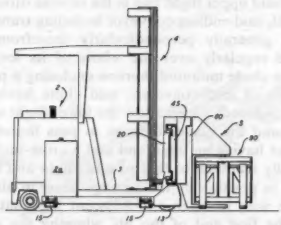
MATERIAL HANDLING APPARATUS

Christian D. Gibson; Ralph E. Allen, and Donald G. Peters, all of Greene, N.Y., assignors to The Raymond Corporation, Greene, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,730

Int. Cl.² B66G 47/00

U.S. Cl. 214—730 5 Claims



1. A material-handling vehicle, comprising, in combination: a base frame; a mast assembly mounted on said base frame; a first carriage suspended from and guided for vertical movement by said mast assembly, said first carriage having four rollers journalled therein for rotation about horizontal longitudinally-extending axes and spaced in a row across the front side of said first carriage; an intermediate carriage mounted on said first carriage for lateral movement relative to said first carriage, said intermediate carriage including first and second channel recesses extending across the rear and front sides, respectively, of said intermediate carriage, and a pair of gear racks affixed to and extending across the front side of said intermediate carriage adjacent the upper and lower edges thereof, said four rollers being seated in said first recess on the rear side of said intermediate carriage; a traverse carriage mounted on said intermediate carriage for lateral movement relative to said intermediate carriage, said traverse carriage including a vertically-extending rigid member which extends to a level below the lower one of said gear racks, a further roller journalled on said vertically-extending rigid member for rotation about a longitudinal axis, said further roller being seated within said second recess on the front side of said intermediate carriage to transmit vertical force from said rigid member to said intermediate carriage; a pair of arms extend-

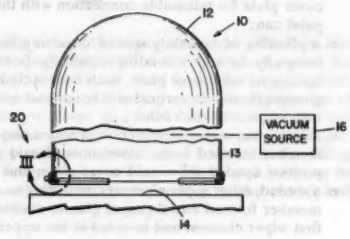
ing longitudinally forward in a fixed direction from said rigid member; a loadengaging carriage support between said arms for pivotal movement at least 90° in either direction from said fixed direction about a vertical axis adjacent the forward ends of said arms; a vertically-extending shaft means journalled on said rigid member; a pair of gears affixed to said shaft means, each of said gears engaging a respective one of said gear racks on said intermediate carriage, and first motive means mounted on said vertically-extending rigid member and connected to rotate said shaft means, thereby to move said traverse carriage laterally relative to said first carriage means, a first and a second of said four rollers on said first carriage are journalled on said first carriage adjacent the lateral edges thereof, respectively and the third and fourth rollers are spaced in between said first and second rollers, said third roller being closer to said first roller than to said fourth roller and said fourth roller being closer to said second roller than to said third roller, said shaft means comprises a hollow shaft carrying said gears, a fixed shaft extending through said hollow shaft and affixed to said rigid member, and bearing means for rotatably supporting said hollow shaft on said fixed shaft.

3,998,347

CREEP RESISTANT SEALING ARRANGEMENT FOR BELL JAR

Gunard O. B. Mahl, San Francisco, Calif., assignor to CHA Industries, Menlo Park, Calif.

Filed Oct. 31, 1975, Ser. No. 627,505
Int. Cl.² B65D *1/10, 23/00, 45/32*
U.S. Cl. 215—1 R **7 Claims**



1. In a vacuum device comprising a closed top cylindrical bell jar having an open bottom defining a planar rim, a flat surface against which said rim seats with a gasket therebetween and a vacuum source communicating with the interior of said bell jar, an improved creep resistant sealing arrangement comprising:

a unitary resilient elastomeric continuous ring having a generally J-shaped cross-section an outer leg of which fits against the outside of said bell jar, an inner leg of which fits against the inside of said bell jar and a cross-member of which fits against the rim of said bell jar;

means for fastening said outer leg with a radially inward force acting against the outside of the bell jar, to oppose outward creeping of said cross-member away from the bottom rim of said bell jar; said inner leg of said ring opposing creeping of said ring away from the bottom rim of said bell jar and out from under said fastening means.

3,998,348

NURSING BOTTLE

Michael Sammaritano, 120 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Filed Aug. 15, 1975, Ser. No. 605,112
Int. Cl.² A61J *9/00*
U.S. Cl. 215—11 E **11 Claims**

1. A nursing bottle assembly comprising a bottle having a closed end and an open end, a nipple disposed over the open end of said bottle, a flexible bag disposed within said bottle, said flexible bag having an open end secured to the open end of the bottle, said flexible bag having a lower end disposed within the bottle and being adapted to receive liquid, biasing means creating a biasing force on said flexible bag tending to

maintain a positive pressure on the liquid in said flexible bag as such liquid is dispensed through said nipple, said biasing means comprising a roller assembly, said lower end of said flexible bag being secured to said roller assembly, and means on said bottle for guiding said roller assembly for longitudinal displacement as the liquid in said flexible bag is dispensed.

3,998,349

CLOSURE MEANS

William J. Megowen, Russell St., Carlisle, Mass. 01741

Division of Ser. No. 123,167, March 11, 1971, Pat. No. 3,733,771. This application Mar. 16, 1972, Ser. No. 235,261
Int. Cl.² B65D *51/26, 53/00*
U.S. Cl. 215—231 **5 Claims**

1. A non-explosive package comprising in combination a fragile container, a gassy liquid situated in and filling most of said container, an orifice in said container for dispensing said liquid, a closure for said orifice having a portion sealing said orifice against gas and liquid flow and an associated volumetric safety insert extending into said container, said safety insert occupying substantially the entire portion of the internal volume of said container not occupied by said gassy liquid when said gassy liquid is at some temperature no greater than 140° F., whereby substantially no free gas is available to contribute to an explosion of said package.

3,998,350

SEMI-MEMBRANE LIKE CONTAINER, HEAT-INSULATED FLUID-TIGHT TANK EMBODYING SAME AND METHODS OF MAKING SAME

Gilbert Jean-Louis Massac, Meudon, France, assignor to Gazocean, Paris, France

Filed Apr. 21, 1975, Ser. No. 570,178
Claims priority, application France, Apr. 25, 1974, 74.14478
Int. Cl.² B65D *7/12, 7/44, 87/24*
U.S. Cl. 220—1 B **9 Claims**

1. A construction forming a container consisting of an impervious envelope of approximately polyhedral shape having its sides formed by flat walls of welded sheet material, both

substantially flat walls of each pair of adjacent sides of said envelope being connected substantially tangentially as a rounded fillet by an intermediate circular concave cylindrical wall portion with generating lines extending in substantially parallel relation to the edge line direction of a dihedral formed by said adjacent sides of said envelope, wherein the improvement consists in that each intermediate connecting cylindrical wall portion is of joined multiple layer construction consisting of a pack of several concentric superposed curved metal plates with an aggregate total thickness at most substantially equal to that of the single metal sheet of said walls of said adjacent sides, said plates being assembled with said adjacent sides by the longitudinal opposite edges of said adjacent sides, respectively, so that the respective exposed faces of the innermost and outermost plates are aligned in substantial flush registering relationship with the corresponding opposite faces of said adjacent walls at said dihedral.

3,998,351

TEAPOT WITH SELF-CONTAINED VESSEL FOR MILK, HONEY, OR OTHER LIQUIDS

Robert J. Smith, and Penelope Smith, both of 30-26 23rd St., Astoria, N.Y. 11102

Filed Dec. 9, 1974, Ser. No. 530,803
Int. Cl.² B47G *19/00*; B65D *21/02*
U.S. Cl. 220—23.83 1 Claim

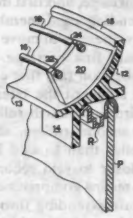
1. In a teapot set, the combination of a teapot, a separate vessel and a cover placeable on each other, said vessel extending approximately one half its height downward into said teapot; said teapot comprising a pot with a top opening through a neck communicating with an interior of said pot, and a spout and handle on opposite sides of said pot; said vessel comprising a pot shaped portion as its upper half with an opening on top, a spout and an ear-shaped handle on opposite sides, and a lower portion comprising a constricted stem extending downward from said pot shaped portion for insertion downward through said teapot opening and into said interior, a shoulder at an upper end of said constricted portion resting upon an upper edge of said teapot neck, the bottom of said stem forming the base of said vessel; said top openings of said teapot and vessel being a same size, and each selectively fitting said cover; said teapot interior being vented by a passage within an interior of a sidewall of said vessel, said passage at its lower end having an inlet port through a bottom wall of said vessel for communication with said teapot interior, said passage extending into an interior of said vessel handle and having an outlet port in a vicinity of a longitudinally center portion of said handle, said passage being narrow and flat, said passage outlet port being on one side of said handle so as to form a side opening, and wherein said cover includes a vent means for venting said vessel when positioned thereon and for venting said teapot when positioned thereon.

3,998,352

ATTACHMENT FOR RIMS OF PAINT CANS OR THE LIKE

Jeffrey E. Hopkins, 78 Fairfield Ave., Danville, Va. 24541

Filed Jan. 14, 1976, Ser. No. 649,046
Int. Cl.² B65D *25/00*; A46B *17/02*
U.S. Cl. 220—90 2 Claims



1. A paint shield for releasable attachment to a paint can of the type having a channeled rim around the open top thereof upon removal of the lid, said shield comprising:

a. a molded annular cover plate, when positioned, extending peripherally around said can and radially from a point inside the inner periphery of said rim upwardly and outwardly to a point above and outside the outer periphery of said rim whereby paint deposited thereon is funneled back into said can;

b. a quick release attachment means formed integrally with and extending downwardly from the underside of said cover plate for releasable connection with the rim of said paint can;

c. a plurality of arcuately spaced mounting bosses formed integrally in and extending upwardly from the upper surface of said cover plate, each boss including a pair of grooves therein in vertical and horizontal spaced relation with respect to each other;

d. a first, inner wiper element comprising a ring-shaped wire member inserted in the lowermost of said grooves in a position spaced above said cover plate; and

e. a second, outer wiper element comprising an annular wire member formed into a ring of greater diameter than said first wiper element and inserted in the uppermost of said grooves.

3,998,353

SECURITY CAP FOR THE FUEL FILLING CONDUIT OF A MOTOR VEHICLE

Mario Farelli, C. so Giulio Cesare 298, Turin, Italy

Filed Feb. 10, 1975, Ser. No. 548,709
Claims priority, application Italy, Feb. 11, 1974, 67371/74; Oct. 16, 1974, 70079/74
Int. Cl.² B65D *55/14*
U.S. Cl. 220—210 9 Claims

1. A security cap for the fuel filling conduit of a motor vehicle, the fuel filling conduit having an inwardly directed flange surrounding a non-circular opening, said security cap comprising

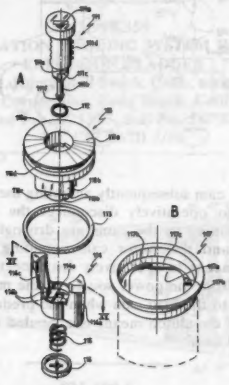
a body (110) having a flange (110*a*) presenting a downwardly facing surface (110*j*), a tang (110*c*) depending from said flange, cam surface means (110*h*) projecting downwardly from said tang, and an opening (110*e*) extending through said flange and tang,

a lock cylinder (111) within said opening and having an extension (111*b*, 111*c*) extending below the bottom of said tang, said cylinder being rotatable within said opening through a limited angle between an open position in which the cap is removable from the filling conduit and a closed position in which the cap is not removable,

an elongated latch (114) carried by said cylinder extension and rotatable therewith about the same axis, said latch

being axially aligned with said body flange surface, and said latch fitting through the opening in the filling conduit flange when in one position of rotation corresponding to the open position of said cylinder and said latch not fitting through that opening in another position of rotation corresponding to the closed position of said cylinder, the filling conduit flange being gripped between said latch and said body flange when said cylinder is in its closed position, and said latch being movable axially of said extension,

spring means (115) urging said latch axially of said extension toward said flange, and



follower tooth means (114*b*) projecting upwardly from said latch and cooperable with said cam surface means for moving said latch axially away from said flange surface, against the force of said spring means, during rotation of said locking cylinder and latch between said open and closed positions of said cylinder so as to reduce the frictional engagement between said latch and the filling conduit flange during rotation of said latch between its positions of rotation corresponding to the closed and open positions of said lock cylinder.

3,998,354

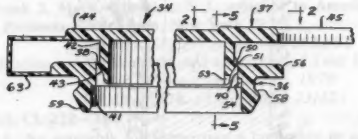
REUSABLE SEALED PLASTIC COVER

John S. Song, 2 Williamsburg Circle, Evanston, Ill. 60203

Filed Mar. 31, 1975, Ser. No. 563,600

Int. Cl.² B65D *41/32*

U.S. Cl. 220—269 **6 Claims**



1. In the combination of a container having a top with an edge defining an opening in the top and a molded plastic closure arrangement comprising a body part and a closure part joined to the body part by a unitary thin section forming a score line along which the plastic is tearable with relative ease, said body part having annular wall means extending through said opening and in annular contact with said edge, said edge pressing said wall means inwardly to provide a sealing contact therebetween, said wall means defining a first annular wall having a top and a bottom, said removable portion including a second annular wall in juxtaposition to said first and also having a top and a bottom, said score line being between said walls, the improvement comprising:

said score line being adjacent the top of the first wall and adjacent the bottom of the second wall whereby there is a portion of the first wall below the score line and a portion of the second wall above the score line;

said annular contact being approximately opposite a bottom part of said first annular wall whereby the pressing of said edge displaces said bottom part inwardly after the closure arrangement is joined to the container from the position of said bottom part prior to said joinder; and

said second wall including means at substantially the same height as the thin section defining a lip integral with the thin section and extending outwardly farther than the bottom of the first annular wall when said closure arrangement and container are joined;

whereby after the plastic at the score line is torn and the closure part is inserted into the body part with the said walls in juxtaposition, said lip projects outwardly below said first wall to releasably lock the closure part to the body part.

3,998,355

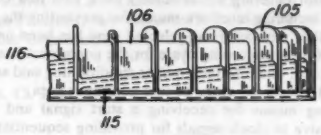
PLASTIC LIDS AND PAILS

Herbert W. Galer, Pine Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 28, 1975, Ser. No. 563,272

Int. Cl.² B65D *41/04*

U.S. Cl. 220—304 **7 Claims**

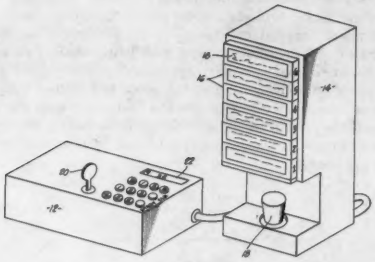


1. A stiff molded plastic lid having a central closing portion and an inverted U-shaped rim, said rim being adapted for engagement with an open head pail, said pail having a top portion including a rim and engagement means, said inverted U-shaped rim being in the form of an inner leg having an inner and outer wall, an outer leg having an inner and outer wall and an arch connecting said inner and outer legs, said arch and the inner walls of said legs being spaced to receive a compression gasket and said top portion of said pail whereby the compression gasket fits between the interior of said inverted U and the rim of said pail and wherein engagement means on the inner wall of the outer leg of said inverted U receive the engagement means on said pail for engagement at a position exterior of the rim of said pail, the engagement means on said pail being in the form of mating threads extending outwardly from the sidewall of said pail and to a position outwardly of the rim of said pail, the engagement means on the outer leg of said inverted U-shaped rim being in the form of screw threads that are arcuate segments extending upwardly along the axis through the center of said lid and have generally planar faces and being parallel to each other, said threads extend outwardly from the inner wall of the outer leg of said inverted U for mating with the threads on said pail, the thickness between the outer wall and the inner wall of said outer leg being substantially uniform so that the outer leg of said inverted U is contoured to follow in parallel the upwardly extending profile of said threads, said lid also containing additional locking means for resisting vibration and said lid being capable of providing an assembly with said gasket and said pail which can withstand the impact arising from a vertical drop of four feet.

3,998,356
ELECTRONIC SYSTEM FOR ARTICLE DISPENSING APPARATUS

Wynn L. Christensen, Yorba Linda, Calif., assignor to Arthur A. Bennett, Jr., West Covina, Calif.

Filed Aug. 28, 1975, Ser. No. 608,643
Int. Cl.² A47B 67/02
U.S. Cl. 221—2 9 Claims



1. An electronic system for article dispensing apparatus wherein the apparatus includes a plurality of containers for dispensing articles, each container being controllable by the system to selectively dispense an article at a predetermined time, comprising

program entry means for entering a selected time for dispensing articles and for entering container data indicative of containers from which respective articles are to be dispensed, said program means comprising first control means for entering the selected time and second control means for entering the container data, said first control means including interlock means for preventing the entry of another time after the selected time has been entered and before a dispensing cycle for the containers has been completed, said interlock means conditioning said second control means for entry of said container data,

sequencing means for receiving a start signal and being responsive to clock signals for providing sequential sampling signals, and

third control means responsive to the container data from said second control means and responsive to the sampling signals from said sequencing means for interrogating logic circuit means for the respective containers, said third control means being responsive to said container data and said sampling signals for providing first output control signals corresponding to containers from which articles are to be dispensed and for providing second control signals for causing generation of said clock signals for said sequencing means.

3,998,357
VENDING CONTROL SYSTEM

Joseph L. Levasseur, St. Louis, Mo., assignor to Coin Acceptors, Inc., St. Louis, Mo.

Filed May 27, 1975, Ser. No. 581,202
Int. Cl.² G07F 11/36
U.S. Cl. 221—21 4 Claims

1. In a vending control system, comprising:

a. an electrical power source,

b. a motor for driving a load,

c. a motor cam switch means connected to the power source and to the motor,

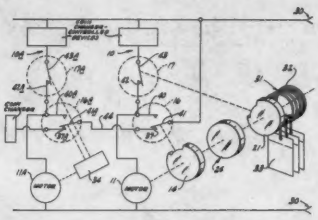
d. a load cam switch means connected to the power source and to the motor,

e. a motor cam drivingly connected to the motor and operatively actuating the motor cam switch means for normally disconnecting the motor from the power source,

f. a load cam operatively actuating the load cam switch means for normally connecting the motor to the power source, the load cam being operatively connected to the load,

g. a torque-limiting clutch means interconnecting the cams for driving the load cam and for permitting relative rotational movement of the cams at a predetermined torque value, and

h. the motor cam actuating the motor cam switch means to operatively connect the motor to the power source, and

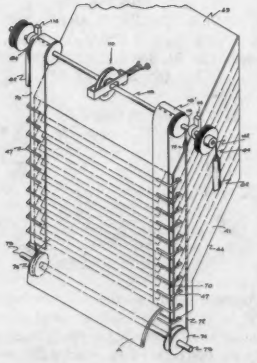


the load cam subsequently actuating the load cam switch means to operatively disconnect the motor from the power source as the cams are drivingly rotated by the motor, and the motor cam actuating the motor cam switch means to operatively disconnect the motor completely from the power source as the motor cam rotates relative to the load cam when the predetermined torque value of the clutch means is exceeded upon jamming of the load cam.

3,998,358
APPARATUS FOR DISPENSING ARTICLES SUCH AS NEWSPAPERS AND THE LIKE

Harry O. Moore, Rte. No. 2, Norman Shores, Huntersville, N.C. 28078

Continuation-in-part of Ser. No. 449,385, March 8, 1974, Pat. No. 3,907,160. This application Sept. 23, 1975, Ser. No. 615,939
Int. Cl.² G07F 11/32
U.S. Cl. 221—91 15 Claims



1. Apparatus for dispensing articles such as newspapers, magazines and the like comprising:

a housing;

b. support means received in said housing for separately receiving and holding articles to be dispensed, said articles being maintained at a downwardly inclined angle to permit gravitational dispensing when unrestrained;

c. pliable restraining means located immediately adjacent a dispensing end of said support means along opposite edges thereof only and being held thereat against any substantial lateral movement, said restraining means being engageable with said articles to be dispensed along the edges of same only; and

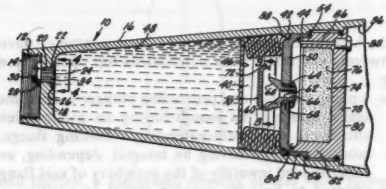
d. a stationary, restraining means drive means located adjacent one end of said article support means and being operatively connected to said restraining means, said drive means being actuatable to move said pliable restraining means a predetermined distance whereby one article only will become unrestrained and is dispensed.

3,998,359

TRANSPIRATION COOLING SYSTEM HAVING AN EXPULSION BLADDER

Ernest M. Pettit, Huntington Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 4, 1975, Ser. No. 547,038
Int. Cl.² B67D *5/40*
U.S. Cl. 222—3 **8 Claims**



1. A system for pressurizing a working fluid comprising:

a truncated conical reservoir having a smaller forward end with an expulsion port therein;

a truncated conical elastomeric expulsion bladder over the larger rearward end of said reservoir to contain said working fluid in said reservoir;

said bladder being about the same size and shape as said reservoir when not under pressure and adapted to collapse at said larger end to provide maximum fluid volume in said reservoir and to extend under pressure toward said smaller end to push said fluid through said expulsion port; and

pressure means subjecting said bladder to pressure from rearward end.

3,998,360

DISPENSER COMBINED WITH HANGING CLIP FOR INVERTED SUPPORT

Frank J. Mack, Kinnelon, N.J., assignor to American Home Products Corporation, New York, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,601
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² A47K *17/02*; **B65D** *23/12*
U.S. Cl. 222—181 **8 Claims**

1. An assembly for supporting a container in an inverted position comprising:

A. a container having a discharge orifice at one end, an end wall at the opposite end, and a plurality of side walls between said ends;

1. a first recess defined in said end wall adjacent a side wall;

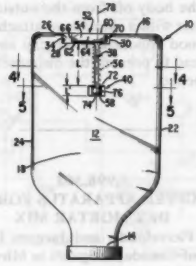
2. means to support a hanger device comprising second and third recesses defined in said adjacent side wall;

a. said second recess extending between said first recess and said third recess and having a predetermined depth, width and length and having outer linear ridges extending toward each other to define a linear opening narrower than the width of said second recess;

b. said third recess having a predetermined depth, width and length, said depth and width being larger than the depth and width of said second recess; and

B. a hanger device rotatably connected to said support means and further comprising;

1. a first planar portion adapted to swivel in said first recess;



2. a cylindrical shaft connected eccentrically to said first planar portion being substantially equal in length to the length of said second recess and adapted to rotate in said second recess;

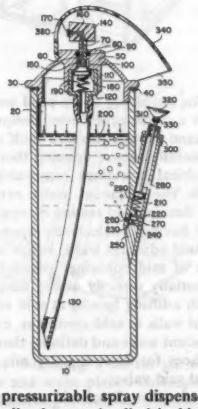
3. a first flange connected to said shaft opposite said first planar portion and adapted to rotate in said third recess, said flange being wider than said second recess.

3,998,361

MANUALLY PRESSURIZABLE SPRAY DISPENSER

John P. Arena, New Rochelle, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Feb. 9, 1976, Ser. No. 656,432
Int. Cl.² B65D *83/14*
U.S. Cl. 222—182 **1 Claim**



1. A manually pressurizable spray dispenser, comprising:

a hollow, vertically elongated cylindrical body with a closed bottom and an open top;

a hollow cylindrical housing with a cylindrical interior base and an open top end attached to the body intermediate the ends of the body and extending upwardly and outwardly from it;

a one way check valve communicating with the interiors of the body and the housing in a manner that air may flow from the interior of the housing to the interior of the body and not in the opposite direction;

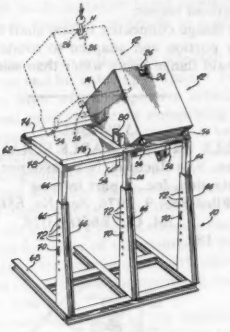
a plunger located in the housing and being freely slidable upwardly and downwardly therein;
a top attached to the top end of the housing and having a tapped hole through which the plunger passes;
a knob attached to the top of the plunger, the knob having a threaded portion that can engage the tapped hole when the pump is not in use and thereby keep the plunger wholly inside the housing;
a cap threadably secured to the top of the body to seal the interior of the body off from the outside;
a spray dispenser with a spray head attached to the cap; and
a protective hood attached to the cap and surrounding the dispenser head to prevent the dispenser from being inadvertantly opened.

3,998,362

PORTABLE HOPPER APPARATUS FOR SUPPLYING A DRY MORTAR MIX

Gilles Lapierre, Pierrefonds, and Jacques Dubois, Laval-des-Rapides, both of Canada, assignors to Miron Company Ltd., Montreal, Canada

Filed May 30, 1973, Ser. No. 365,425
Int. Cl.² B65G *3/06*
U.S. Cl. 222—185 **4 Claims**



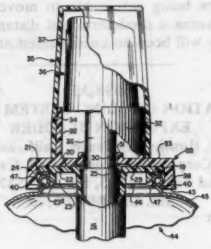
1. Apparatus for supplying a dry sand and cement mortar mix or the like at a construction site, comprising:
a supporting stand having elevated shelf means defining at least one generally square opening therethrough;
a generally cubical container removably seated in said opening with two adjacent walls extending obliquely downwardly through and resting on opposite sides of said opening and having a selectively openable valve at the juncture of said adjacent walls, below said opening;
an upper edge of said container parallel to said juncture being substantially directly above said valve and being provided with a lifting handle at said edge;
oblique internal walls in said container, extending between said two adjacent walls and defining therewith funnel-like guiding surfaces for directing dry mix within said container toward said valve;
wherein opposed side walls of said container perpendicular to and extending between said adjacent walls being configured to define extensions extending diagonally from said juncture, all portions of said valve being within the lateral outline of said extensions; and legs extending from said container at the edge of one of said adjacent walls opposite said juncture whereby said legs and extensions may support said container on a horizontal surface with said one of said adjacent walls extending generally horizontally above said surface and with all portions of said valve being above said surface.

3,998,363

SPRAY DISPENSER PUMP ASSEMBLY

Steven W. Beres, Bridgeport, and Richard J. Nash, Monroe, both of Conn., assignors to VCA Corporation, Baton Rouge, La.

Filed July 31, 1975, Ser. No. 600,839
Int. Cl.² B65D *47/28*
U.S. Cl. 222—321 **5 Claims**



1. A spray dispenser assembly for a container having an outwardly extending bead adjacent its top opening comprising:
a. a pump cylinder and protruding plunger carried thereby, said cylinder at its mouth having an annular, integral, one-piece, outwardly extending mounting flange, said mounting flange having an integral, depending, annular collar spaced inwardly of the periphery of said flange and adapted to hold an annular gasket in position on the underside thereof; and,
b. a snap-on plastic closure comprising an inverted, dish-shaped member having:
i. a disk-like body provided with a central opening through which said plunger extends and in which said plunger is reciprocable; and,
ii. an integral, depending, peripheral skirt having an annular undercut closely adjacent the disk-like body for receiving and holding captive said mounting flange of the pump cylinder with the top of said mounting flange engaged by the underside of the disk-shaped body, said peripheral skirt having in its inside wall an annular bead for engaging the lower outer portion of said bead of said container when the closure is snapped over the top opening thereof to form a liquid-tight seal between said mounting flange, said gasket and said bead of said container.

3,998,364

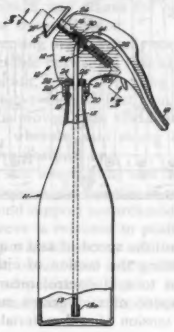
DISPENSING VALVE FOR BOTTLED CARBONATED BEVERAGES

Bruce Lee Hollander, 1240 NE. 207 Terrace, Miami, Fla. 33179

Filed Apr. 15, 1974, Ser. No. 460,803
Int. Cl.² B67D *1/04*; **F16L** *55/14*; **B65D** *83/14*
U.S. Cl. 222—511 **8 Claims**

1. A dispensing valve for bottled carbonated beverages comprising, in combination, a valve body member, a passageway of substantially circular cross-sectional shape extending through said body member and defining, with outer surface portions thereof, respective entrance and discharge openings, means for removably securing said body member to the neck of a beverage bottle, said securing means being circumjacent said entrance opening so that said passageway is in communication with the open mouth of the bottle to which said body member is secured, a length of flexible tubing extending through said passageway and projecting outwardly of said entrance opening and said discharge opening, valve mechanism carried by and moveable between first and second positions with respect to said body member, means resiliently

retaining said valve mechanism in said first position whereat it is operative to squeezingly collapse a portion of said tubing within said body member for shutting off the flow of fluid therethrough, said valve mechanism including means operative upon manually moving said valve mechanism to said second position for releasing said tubing to permit the flow of fluid under pressure therethrough, said valve mechanism being located in a blind cylindrical opening in said body member the longitudinal axis of which extends transversely through said passageway, said valve mechanism comprising a valve plunger mechanism having a plunger portion slidably received within said cylindrical opening and extending outwardly of the



open end thereof, a transverse opening in said valve plunger portion through which said length of tubing extends, said plunger opening having inner and outer end wall portions, said means resiliently retaining said valve mechanism comprising a compression spring constrained between the inner end of said plunger portion and the bottom wall of said blind cylindrical opening, said compression spring being operative, normally, to resiliently urge said plunger portion in the outward direction so that said outer wall portion of said plunger opening serves to squeezingly collapse a portion of said length of tubing passing therethrough against opposite side wall portions of said passageway.

3,998,365

METHOD AND ARRANGEMENT FOR DISPENSING QUANTITIES OF MOLTEN METAL BY PNEUMATIC PRESSURE

Robert Lethen; Fritz Ostler, both of Simmerath, Lammersdorf; Heinz Heimerich, Roetgen, and Manfred Kienert, Simmerath, Lammersdorf, all of Germany, assignors to Otto Junker GmbH, Simmerath, Germany

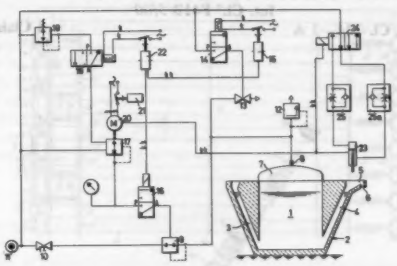
Filed May 7, 1975, Ser. No. 575,405

Claims priority, application Germany, July 10, 1974, 2433060

Int. Cl.² B22D *39/00*

U.S. Cl. 222—590 **28 Claims**

1. A method of pouring, in at least two successive pouring operations, predetermined amounts of molten metal from a container having an interior closed off substantially gas-tightly and provided with a pourout conduit which has an inlet communicating with the interior of the container and which has an outlet pouring opening located outside the container above the highest level to which molten metal in the container interior is permitted to rise during the method, comprising the steps of selecting pouring pressure values utilizing a pouring pressure selector; selecting starting pressure increase functions utilizing a starting pressure selector; establishing the metal in said conduit at a fixed starting level prior to the start of the first pouring operation by feeding pressurized gas into the space above the molten metal in the container interior; and thereafter effecting each pouring operation by activating the pouring pressure selector to effect a first boost of the gas pressure in said space by the amount of a selected pouring pressure value so as to effect pouring out through said opening of the quantity of molten metal to be dispensed, during each such pouring operation activating the starting pressure selector to cause the latter to superimpose upon the first pressure boost a second pressure boost equal to a selected starting pressure increase function, and at the end of each pouring



operation activating means operative for decreasing the gas pressure in said space by the amount of the selected pouring pressure value so as to cause the metal in said conduit to return to the fixed starting level in readiness for the next pouring operation, the pressure prevailing in said space at the end of such gas pressure decrease constituting the new starting pressure, and maintaining such new starting pressure until the start of the next following pouring operation.

3,998,366

FORMER FOR MOULDING FLARED SKIRTS

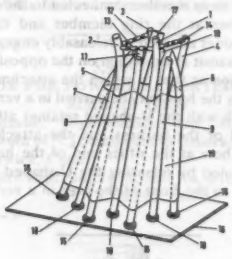
Cyril George Cannon, and John Anthony Carter, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Dec. 31, 1975, Ser. No. 645,656

Claims priority, application United Kingdom, Jan. 3, 1975, 762/75

Int. Cl.² A41H *5/00*

U.S. Cl. 223—68 **4 Claims**



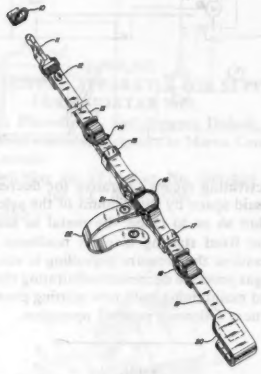
1. A former for moulding a fabric garment shape, said former having hip and waist planes corresponding to a person's body and comprising at least seven members arranged in two groups about an imaginary common line, such that the first group comprising at least six interconnected members define a geometrical figure selected from the group consisting of a quadrilateral, pentagon and hexagon at the waist-plane and a hexagon at the hip-plane, and the second group comprising at least one member located between the first group and the imaginary common line so that a fabric can be contacted with the outer edges of the members of the first group and with the inner edges of the members of the second group to form a series of convolutions in the fabric, the members of

the first group extending at least from the hip-plane to the waist-plane.

3,998,367

SHOULDER HARNESS FOR CARRYING AN ARCHERY BOW

Jack F. Harding, 672 S. Burmont Ave., Lafayette, Colo. 80026, Filed Feb. 4, 1974, Ser. No. 439,109
Int. Cl.² F41B 5/00
U.S. Cl. 224—1 A 4 Claims



1. A bow and harness structure adapted to be carried in transit on the back of a user and, alternatively, being quickly repositionable for casting an arrow, the structure comprising an archery bow, a harness attached to the bow adjacent the center portion of the bow by attachment means, the harness being in the form of a first strap connected at one end to the attachment means and connected at the other end to a closed loop belt member by a ring member, the harness further including a second strap member connected to the belt loop and first strap member at the ring member and carrying a U-shaped hook retainer adapted to releasably engage and secure the bow during transit at a position on the opposite side of the bow center portion as that to which the attachment means is secured, whereby the bow may be carried in a vertical position on the users back with the U-shaped retainer attached to the bow at one end of the harness and the attachment means attached to the bow at the other end of the harness but be quickly repositioned by releasing the U-shaped member and moving the bow to the front of the user in a vertical position to cast an arrow.

3,998,368

TENSION CONTROL FOR CONTINUOUS LENGTHS OF TEXTILE MATERIAL

Robert F. Hackney, Dalton, Ga., assignor to West Point Pepperell, Inc., Dalton, Ga.

Continuation-in-part of Ser. No. 538,389, Jan. 3, 1975, abandoned. This application Dec. 11, 1975, Ser. No. 639,775
Int. Cl.² B65H 25/04
U.S. Cl. 226—42 30 Claims

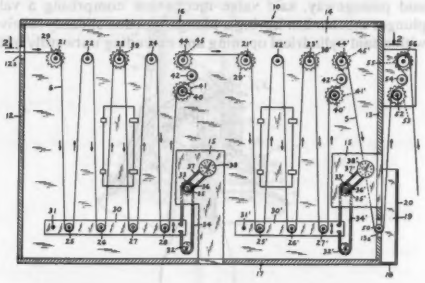
1. Apparatus for leading long lengths of woven or nonwoven textile material over a series of rolls in a sinous path comprising a series of parallel horizontal rolls arranged in upper and lower tiers,

means mounting the rolls of the upper tier rotatably in spaced stationary positions,

separate means at opposite ends of the lower tier supporting the rolls of the the lower tier as a group in horizontally spaced positions,

means pivotally mounting said separate supporting means at one end for movement separately when the tension of the passing material tends to vary,

electric motor-driven means to rotate at least one of the upper tier of rolls,



means to control the speed of said motor-driven means,

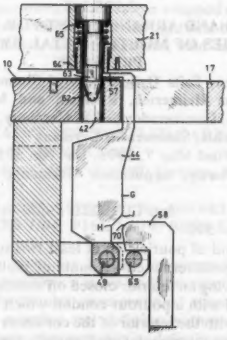
means transmitting the motion of either of said separate supporting means to said control means for automatically controlling the speed of said driven means in response to variations in the tension of said material as it passes through the apparatus.

3,998,369

DEVICE FOR ACCURATELY POSITIONING A FLEXIBLE STRIP WITH RESPECT TO AN IMAGE

Henri Grosjean, le Plessis Trevise; Jean Lassechere, Paris, and Pierre Louis Sigel, Villeneuve-le-Roi, all of France, assignors to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed May 1, 1975, Ser. No. 573,470
Claims priority, application France, May 8, 1974, 74.15944
Int. Cl.² G03B 1/28
U.S. Cl. 226—58 13 Claims



1. An apparatus for positioning a flexible strip with respect to an image, said flexible strip including at least one series of lateral perforations having a perforation cross-section, comprising in combination:

a first support having at least one opening therethrough, said opening having an opening cross-section, said first support defining a sliding surface for said flexible strip;

a second support having a first position at a predetermined distance from said first support and a second position in

close proximity with said first support, said image being fixedly secured to said second support and in contact with said flexible strip in said second position;

means for moving said second support between said first and second positions;

at least one stud member secured to said second support member is substantial alignment with said opening of said first support, said stud member including a working section having a working cross-section, a sleeve slidably engaging said working section and movably operable between a first sleeve position substantially encasing said working section and a second sleeve position disclosing said working section, and means for biasing said sleeve towards said first sleeve position;

at least one intercepting arm pivotally secured to said first support and operable between a first arm position and a second arm position, said intercepting arm interferingly engaging said sleeve in said first arm position as said second support is moved from said first position to said second position, whereby said sleeve is urged towards said second sleeve position; and

means for rotating said intercepting arm from said first arm position to said second arm position in response to movement of said second support towards said second position, whereby said sleeve is released to positionally maintain said flexible strip with respect to said image;

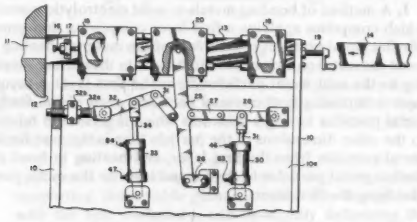
said working section of said stud substantially engaging said one of said lateral perforations prior to release of said sleeve to substantially align said flexible strip with respect to said image.

3,998,370

FEED APPARATUS

Charles J. Grimland, Garland, Tex., assignor to Micro Forms, Inc., Garland, Tex.

Filed Sept. 15, 1975, Ser. No. 613,344
Int. Cl.² B65H *17/44*
U.S. Cl. 226—150 **22 Claims**



1. Apparatus for feeding length stock into a cyclic working tool comprising:

a. frame means mounting clamp means in a fixed position adjacent to the feed entry of said tool,

b. traveling clamp means aligned with the fixed position clamp means and mounted for linear reciprocal movement between a first position removed from the fixed position clamp means and a second position adjacent the fixed position clamp means, and

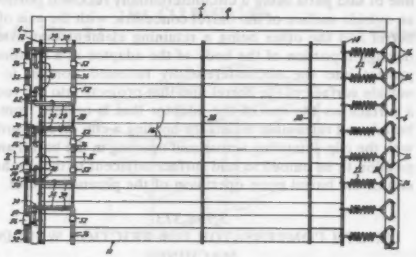
c. means for moving said traveling clamp means between said first and second positions including a lever having one end connected to the traveling clamp means and coupled with a double-acting cylinder by a linkage comprising two interconnected elongated members, one end of one of said members connected to said lever and the opposite end of the other of said members connected at a fixed point on said frame means, and said cylinder connected between a fixed point on said frame means and one of said elongated members.

3,998,371

SPRING EDGE FOR FURNITURE DECKS

Lloyd E. Tieman, Carthage, Mo., assignor to Flex-O-Lators, Inc., Carthage, Mo.

Filed Mar. 31, 1976, Ser. No. 672,398
Int. Cl.² F16F *3/00*
U.S. Cl. 267—102 **9 Claims**



1. In combination with a furniture seat including a rigid frame and wire fabric deck sheet extending over said frame and being resiliently supported thereby for downward yieldability, a spring edge assembly extending across the forward edge of said seat and comprising:

a. A series of spring elements spaced across the forward edge of said frame, each of said elements being substantially V-shaped in a vertical plane opening forwardly, and formed of a single length of spring wire, said wire having a transversely horizontal top reach at the upper end of said V-formation, a downwardly and rearwardly sloping upper leg extending from each end of said top reach to the apex of said V-formation, a transversely horizontal torsion leg extending from the lower end of each of said upper legs, and defining the apex of said V-formation, and a lower leg extending forwardly from the end of each of said torsion legs not connected to the associated upper leg;

b. Means securing the forward ends of said lower legs to said frame; and

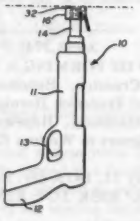
c. Means securing said torsion legs to said deck sheet rearwardly of the forward edge of said deck sheet.

3,998,372

ADAPTOR FOR POWDER ACTUATED TOOL OR SIMILAR ITEM

Ignazio Leonardo, Mountainside, and Michael Faruolo, Elizabeth, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Sept. 24, 1975, Ser. No. 616,510
Int. Cl.³ B25C *7/00*
U.S. Cl. 227—9 **11 Claims**



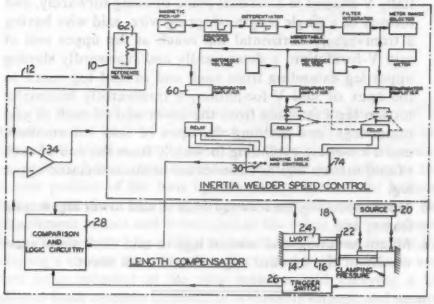
1. An adaptor for a percussion tool that has a barrel from which a pin is driven into a surface adjacent to a discharge end of the barrel, said adaptor including a body portion with a

socket therein for receiving a portion of the barrel and that terminates in the discharge end of the barrel, the socket having an opening at one end thereof in alignment with an opening through which the pin is discharged from the barrel, means for holding the adaptor on the end of the barrel with the adaptor rotatable about the axis of the barrel, said means including inter-engaging parts of the adaptor and the barrel, one of said parts being a circumferentially recessed portion of an outside surface of the barrel concentric with the axis of the barrel and the other being a retaining element that extends through a portion of the body of the adaptor at a location to project into the circumferentially recessed portion in the outside surface of the barrel and that projects into the recess, a surface on the end of the adaptor that is remote from the barrel, and releasable means for holding a clip on said surface with the clip extending across said opening in the barrel and in position to be pinned to said surface adjacent to the discharge end of the barrel upon operation of the percussion tool.

3,998,373
LENGTH COMPENSATOR FOR FRICTION WELDING MACHINES

Thaddeus M. Jones, St. Joseph County, Ind.; Edward L. Johnson, Peoria County, Ill., and Jozef Kiwalle, Delaware County, Pa., assignors to Production Technology Inc., Peoria, Ill.

Filed Sept. 15, 1975, Ser. No. 613,679
Int. Cl.² B23K *19/02*
U.S. Cl. 228—2 **16 Claims**



1. In combination with a friction welding machine having a variable weld speed, length comparison apparatus comprising:

a. means for measuring the combined length of a pair of parts to be welded and producing an output representative of said combined length; and

b. means responsive to said output of said measuring means for varying the weld speed of said friction welding machine so as to produce welded pieces of uniform length regardless of variations in the combined length of said parts.

3,998,374
METHOD OF FORMING A LAMINATE

Benjamin Howell Cranston, Hamilton Township, Mercer County, N.J.; Carl Frederick Hornig, Kingston, N.H., and Donald Arthur Machusak, Hopewell Township, Mercer County, N.J., assignors to Western Electric Company, Inc., New York, N.Y.

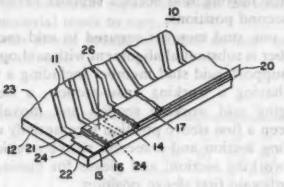
Filed July 11, 1975, Ser. No. 596,028
Int. Cl.² H05K *3/24*; B23K *28/00*
U.S. Cl. 228—107 **5 Claims**

1. A method of forming a laminate, which comprises:

a. placing a metal film in juxtaposition to a first surface to be joined thereto;

b. positioning a buffer medium proximate said film, said buffer medium having an explosive charge on at least one surface thereof; and

c. detonating said explosive charge to propel said film against an edge of said first surface to shear at least a

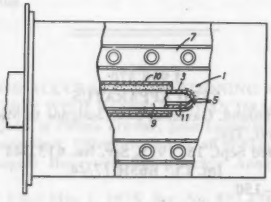


portion of said film from the remainder thereof, corresponding in shape to said first surface, to bond said sheared portion to said first surface.

3,998,375
BONDING OF METALS TO SOLID ELECTROLYTES

Derek Austen Rudd, Pulloxhill, England, assignor to George Kent Limited, England

Filed Dec. 5, 1975, Ser. No. 638,091
Claims priority, application United Kingdom, Dec. 9, 1974, 53211/74
Int. Cl.² G01N *27/30*
U.S. Cl. 228—122 **11 Claims**



1. A method of bonding metals to solid electrolytic material which comprises applying a first layer comprising thin generally flat metal particles to a surface of the material, heating to bond the metal particles in the first layer to the surface, applying to the said metal particles from the first layer a second layer comprising further metal particles, each of the further metal particles having a thickness which is greater in relation to the other dimensions of the particle than is the case for the metal particles from the first layer, and heating to bond the further metal particles in the second layer to the metal particles from the first layer.

3,998,376
METHOD FOR FORMING A CONNECTION BETWEEN TWO TUBES

Walter E. Haines, Bloomfield Hills, Mich., assignor to Estan Manufacturing Company, Troy, Mich.

Filed Dec. 12, 1975, Ser. No. 639,991
Int. Cl.² B23K *1/04, 1/12*
U.S. Cl. 228—154 **2 Claims**

1. A method of forming a connection between two tubes comprising the steps of:

a. piercing an opening in the sidewall of a primary tube,

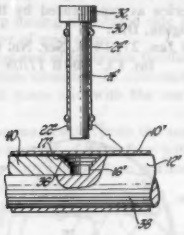
b. deforming the edge of the opening inwardly of the tube to form a depression having a diameter greater than the diameter of the opening,

c. inserting a secondary tube into the opening in said primary tube,

d. applying a suitable solder material to the juncture between the secondary tube and opening in the primary tube,

e. melting the solder material so that it pools in the depression and fills the space between the tubes,

f. freezing the solder material to form a sealed connection between the tubes; wherein the steps of piercing, deforming and inserting the secondary tube being effected substantially simultaneously.



3,998,377

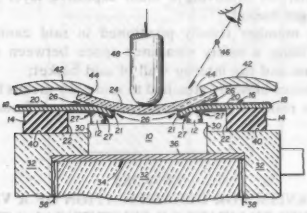
METHOD OF AND APPARATUS FOR BONDING WORKPIECES

Jack L. Metz, Des Plaines, Ill., assignor to Teletype Corporation, Skokie, Ill.

Continuation of Ser. No. 530,642, Dec. 9, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,198

Int. Cl.² H01L *21/603*

U.S. Cl. 228—180 A 28 Claims



1. An improved method of bonding together a first and a second workpiece at a bonding site, of the type wherein bonding energy is applied to the site while the workpieces are urged together, the energy melting contacting portions of at least one of the workpieces at the site to form a bond, which method comprises the step of:

a. urging the workpieces together at the site during the application of bonding energy, by moving a rigid, self-supporting, deformable planar member into engagement with the first workpiece, and by slightly deforming the planar member to form a capillary space between the member and the first workpiece, the capillary space attracting molten components at the site thereinto.

26. An improved method of bonding together a first and a second workpiece at a bonding site, the method being of the type wherein bonding energy is applied to the site while the workpieces are urged together, the energy melting contacting portions of at least one of the workpieces at the site to form a bond, wherein the improvement comprises the step of:

urging the workpieces together at the site during application of bonding energy by

i. moving a planar member into engagement with a first workpiece, and

ii. pressing a rigid force applying member against the outer surface of the planar member at a region laterally spaced from the area of said engagement thereby deforming the planar member to form a capillary space between the planar member and the first workpiece,

the capillary space attracting molten components at the site thereinto.

3,998,378

FOLDING BOX HAVING A RECTANGULAR LIQUID-TIGHT CEMENTED BOTTOM

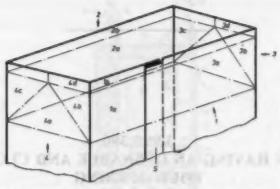
Wilhelm Vetten, Dusseldorf, Germany, assignor to Jagenberg Werke AG, Dusseldorf, Germany

Filed Mar. 24, 1976, Ser. No. 669,799

Claims priority, application Germany, May 7, 1975, 2520401

Int. Cl.² B65D *5/06*

U.S. Cl. 229—3.1 2 Claims



1. A folding box having a liquid-tight sealed bottom of substantially rectangular configuration, the bottom being formed of first and second facing pairs of panels of the end section of the box wall which end section is not slit about its entire periphery, the pairs of panels being folded down on one another at 90° to the longitudinal axis of the box, the first pair of panels each including a triangular area and two additional areas forming a folding pocket with the two additional areas lying over the triangular area, a fillet seam lying flat along the box bottom and formed of a narrow strip about the entire end section of the box wall, the central area of the bottom being arched toward the inside of the box, the box including a pair of parallel ridges at the sides of the bottom defining the second pair of panels, the ridges being elevated relative to the bottom in inverted position and tapering toward the first pair of panels.

3,998,379

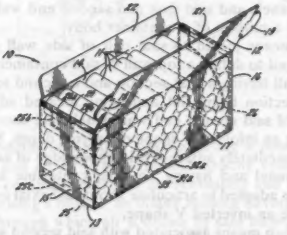
COIN ROLL BOX

Edward Myers, Streamwood; James B. Hale, Deerfield, and James S. Mentzer, Park Ridge, all of Ill., assignors to Cummins-Allison Corporation, Glenview, Ill.

Filed Mar. 17, 1976, Ser. No. 667,869

Int. Cl.² B65D *5/22*

U.S. Cl. 229—33 10 Claims



1. A coin roll box formed from a unitary blank and comprising the combination of

a. a first side wall that is detachable from three adjacent walls and integrally hinged to a fourth wall so as to form a first lid that can be opened to permit coin rolls to roll into the box during the loading thereof,

b. a second side wall adjacent said first side wall and detachable from said first side wall and the two walls that are adjacent both the first and second side walls so as to form a second lid that can be opened to permit inspection of the ends of the coin rolls packed in the box,

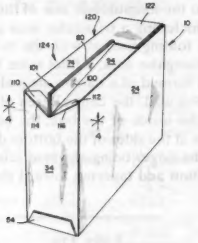
c. and a plurality of internal flaps formed as integral parts of the box walls and forming tabs which fit into complementary slots in the adjacent walls of the box to hold the box together, said tabs also holding said flaps against the respective box walls over which the flaps are folded so that the flaps do not interfere with the loading of the coin rolls into the box.

3,998,380

CARTON HAVING AN OPENABLE AND CLOSEABLE POUR OPENING

Kanelos John Kanelous, 22 North Forest Ave., Rockville Centre, N.Y. 11570

Filed Dec. 16, 1975, Ser. No. 641,237
Int. Cl.² B65D *5/72*, *5/54*
U.S. Cl. 229—17 R 11 Claims



1. A carton formed from a single carton blank of semi-stiff sheet material, said carton comprising:

a. a pair of side wall panels, each of said side wall panels having an upper edge;

b. a first end wall panel having an upper edge and a width of a constant dimension;

c. a second end wall panel having an upper edge;

d. bottom closure flap means arranged with said pair of side wall panels and said first and second end wall panels to define a portion of a container body;

e. flap means joined to said pair of side wall panels and arranged to define a top wall of said container body, said top wall having a first section and a second section, said first section being flat and being located adjacent said edge of said second end wall panel, said second section having an infolded V shape of varying depth, being deepest immediately adjacent said upper edge of said first end wall panel and having an axial centerline said second section adapted to articulate about said axial centerline to assume an inverted V shape;

f. a pull tab means associated with said second section; and

g. a pair of tabs, each of said tabs attached to said upper edge of said first end wall panel along a line of weakening, each of said pair of tabs adapted to be secured to said second section of said top wall, said pair of tabs separating from said first end wall panel along said lines of weakening when an upwardly directed force is first exerted on said pull tab means and said second section articulating about said axial centerline to assume an inverted V shape to form a pour opening in said first end wall panel and said top wall, said second section returning to its infolded V shape to close said pour opening when a downwardly directed force is exerted on said pull tab means.

3,998,381

APPARATUS FOR REMOVING EXPLOSIVE MATERIAL FROM A CENTRIFUGE BASKET

Lorin Richard Daub, Blacksburg, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 652,942
Int. Cl.² B04B *11/08*
U.S. Cl. 233—3 3 Claims

1. An apparatus for safely removing explosive nitrocotton caked material from a circularly shaped wringer basket of a centrifuge which comprises:

shaft support means for rotatably and slidably holding said apparatus when in a removal and a retract position;

plow means, operatively disposed on said shaft support means, for removing a main explosive layer from said wringer basket;

a stop member fixedly positioned in said centrifuge for providing a safety clearance space between said plow means and the interior wall of said basket;

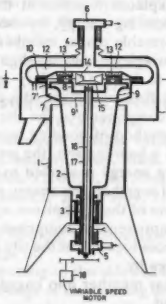
rake means biasedly attached to said plow means for removing a residual explosive nitrocotton layer from said basket.

3,998,382

MECHANISM FOR DEGASIFICATION OF A VISCOUS LIQUID BY MEANS OF CENTRIFUGAL ACTION

Hanns Decker, Cologne, and Willy Jakobs, Porz-Grengel, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Nov. 1, 1974, Ser. No. 520,015
Int. Cl.² B04B *1/12*, *11/04*
U.S. Cl. 233—7 15 Claims



1. A centrifuge for degasification of a viscous liquid, comprising:

a rotor having inlet means for said liquid at one end and outlet means at the other end;

means for driving said rotor, whereby to create on the inner wall surface of said rotor a film of liquid flowing from said

inlet means to said outlet means of the rotor and containing a bubble-poor and a bubble-rich portion of liquid;

said outlet means including means for withdrawal of said bubble-poor and said bubble-rich liquid portions separately;

at least one pump having its suction side in communicaton with the interior of said rotor;

means at the outlet end of said rotor forming a circumferential accumulation chamber in communication with the interior of said rotor and with the suction side of said pump; and

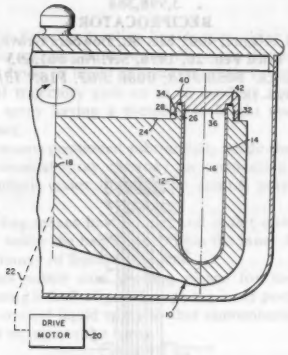
a feed pipe in communication with the suction side of said pump having a portion of its surface within said accumulation chamber with said surface portion being provided with a plurality of passage openings.

3,998,383

GRADIENT SEPARATION APPARATUS

William A. Romanauskas, Southbury, and Oakley L. Weyant, Sandy Hook, both of Conn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 16, 1975, Ser. No. 596,233
Int. Cl.² B04B *9/12*
U.S. Cl. 233—26 **12 Claims**



1. A centrifuge having a rotor with a vertically oriented spin axis for effecting horizontal gradient separations of a sample and vertical gradient reorientation of the separated sample components comprising, in combination:

a plurality of elongated sample containers,

housing means for mounting said containers about the spin axis of said rotor with the axis of each said container generally parallel to said spin axis,

each said housing means being independent of said container and completely enclosing and providing a rigid support in all directions for a different said container particularly against vertically directed fluid pressure forces.

3,998,384

PNEUMATIC THERMOSTAT ASPIRATOR

Ronald L. Martin, Mount Prospect, and Donald E. Meyer, Cicero, both of Ill., assignors to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 128,771, March 29, 1971, abandoned.
This application Apr. 23, 1973, Ser. No. 353,261
Int. Cl.² G05D *23/12*
U.S. Cl. 236—87 **6 Claims**

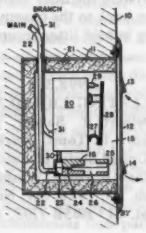
1. In a pneumatic condition control system including a pneumatic condition control device mounted in a substantially enclosed chamber, coverplate means associated with the chamber, the coverplate having ingress and egress slot means, and a source of primary air under pressure, the improvement comprising:

an aspirator mounted in the chamber and connected to the source of primary air under pressure, said aspirator comprising:

a housing:

inlet means in the housing connected to the source of primary air under pressure;

ambient air intake means in the housing; and,



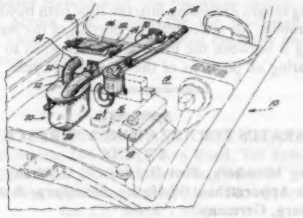
a slit restriction comprising a shallow channel formed in a portion of the housing of the aspirator and arranged to communicate with the inlet means and to direct a relatively thin and wide jet of primary air past the ambient air intake means, the jet thereby entraining ambient air in the chamber, whereby ambient air is drawn into the chamber through the ingress slot means and is caused to depart the chamber through the egress slot means.

3,998,385

AUTOMOBILE LITTER EVACUATION SYSTEM

David W. Ogle, Alderwood Manor, Wash., assignor to Litco Enterprises, Inc., Alderwood Manor, Wash.

Filed Aug. 13, 1973, Ser. No. 388,007
Int. Cl.² B60H *1/02*
U.S. Cl. 237—12.3 B **16 Claims**



1. In combination with a vehicle having a passenger compartment and an air ventilating and heating system for said passenger compartment, said air ventilating and heating system comprising a blower, an intake housing having an air inlet opening through which air is drawn by said blower, an outlet housing through which air is directed by said blower into said passenger compartment, and a heater through which air can be selectively directed for heating the air passing into the passenger compartment,

a litter evacuation system to remove litter from said passenger compartment, said system comprising:

a. a litter receptacle means mounted to said vehicle for collection and retention of litter from the passenger compartment,

b. a removal tube means leading from said passenger compartment to said receptacle,

c. air suction means leading from said receptacle means

to said intake housing and arranged to draw air from said receptacle means while leaving litter therein, and

d. activating means to cause operation of said blower to create a suction in said vehicle housing and thus cause an inflow of air through said removal tube means into said receptacle means, through said suction means, and into said intake housing,

whereby litter placed in said removal tube means is moved by air flow therethrough into said receptacle means, with air being recirculated from said passenger compartment through said litter removal system for litter removal, and through said air ventilating system back to the passenger compartment, and with litter remaining in said litter receptacle means.

3,998,386

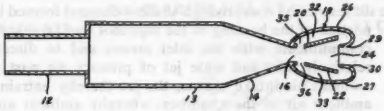
OSCILLATING LIQUID NOZZLE

Hermann Viets; Delbert F. Balster, both of Montgomery County, and Howard L. Toms, Clark County, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,574

Int. Cl.[2] B05B *1/08, 1/34*

U.S. Cl. 239—102 **4 Claims**



1. An oscillating liquid nozzle, comprising: a liquid flow channel having converging portion; an exit orifice adjacent the coverging portion of said flow channel, means for supplying a continuous flow of liquid through said flow channel; a fluidic oscillator connected to the output of said flow channel; said fluidic oscillator including a pair of inner wall members positioned adjacent the exit orifice on opposite sides of the exit orifice; said inner wall members being spaced from said exit orifice to form control ports; a pair of outer wall members secured to the liquid flow channel and extending forward of each of said inner wall members; a flow scoop on the forward end of each of said outer wall members, said flow scoops including means extending into the flow path beyond the inner wall members, for intercepting a portion of the liquid flow and directing it between the inner and outer walls to said control ports during all portions of the oscillating cycle.

3,998,387

APPARATUS FOR TREATING A SURFACE WITH A LIQUID

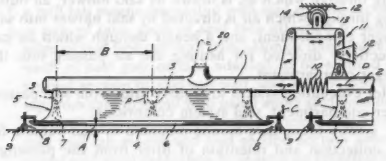
Wolfgang Maasberg, Post Drevenack, Germany, assignor to Woma-Apparatebau Wolfgang Maasberg & Co. GmbH, Duisburg, Germany

Filed Oct. 23, 1975, Ser. No. 625,093

Claims priority, application Germany, Oct. 24, 1974, 2450510

Int. Cl.[2] B05B *3/14;* **B08B** *3/02;* **B63B** *59/00*

U.S. Cl. 239—102 **12 Claims**



1. An apparatus for treating a surface with a liquid, said apparatus comprising:

a support displaceable over said surface,

a spray beam on said support,

a plurality of nozzles on said beam directed at said surface,

means for supplying said liquid to said nozzles and directing a stream of said liquid from each nozzle toward said surface,

means on said support for maintaining said nozzles a predetermined distance from said surface,

a diffuser surrounding at least one of said nozzles and having a deflector surface for diverting the respective stream of said liquid to flow in a direction generally parallel to said surface, and

means for adjusting the distance of said nozzles from said surface independently of the distance of said diffuser therefrom.

3,998,388

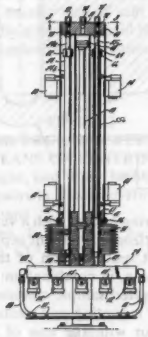
RECIPROCATOR

Anthony M. Alagna, 4001 Elm St., Downers Grove, Ill. 60515

Filed Feb. 26, 1976, Ser. No. 661,693

Int. Cl.[2] B05B *3/18;* **B08B** *3/02;* **F16N** *13/22*

U.S. Cl. 239—187 **23 Claims**



1. Reciprocating spray apparatus for traversing a spray head between extended and retracted position comprising, a support, reciprocatable manifold means for carrying said spray head and having ports for connection thereto, drive means attached to said support and having a driving member connected to said manifold means for reciprocating same between extended and retracted positions, a plurality of co-axial tube sets each having an inner tube and an outer tube slidable thereover, one end of each of said tube sets being fixed to said support and the opposite end connected to said manifold means at the ports therein, bearing means on said support for slidably supporting said tube sets at an intermediate position thereof, and means coupling fluid to be sprayed to the fixed end of one of said tube sets and pilot air for spraying said fluid to the fixed end of another of said tube sets, whereby said co-axial tubes serve as conduits for said fluid and pilot air respectively to said spray head while supporting same for reciprocation.

3,998,389

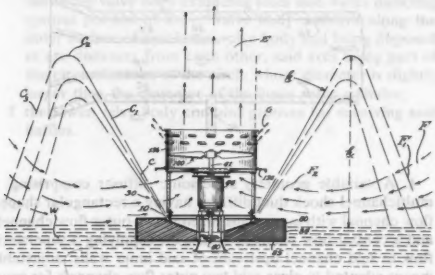
APPARATUS FOR GAS TREATMENT OF LIQUIDS

Clark B. Rose, Chicago, and Richard B. Kelley, Rockford, both of Ill., assignors to Richards of Rockford, Rockford, Ill.

Continuation-in-part of Ser. No. 273,181, July 19, 1972, Pat. No. 3,771,724, and a continuation of Ser. No. 412,629, Nov. 5, 1973, abandoned. This application July 31, 1975, Ser. No. 600,727

Int. Cl.² B05B *3/08, 3/10, 7/28;* B01F *7/22*

U.S. Cl. 239—214.21 27 Claims



1. An apparatus for treating liquids comprising:

means for spraying liquid upwardly above the surface of a parent body of liquid in a substantially inverted frusto-conical trajectory path so as to produce a chimney of liquid spray having a measurable height and an inner diameter,

cowling means positioned substantially inside the trajectory frusto-conical spray chimney for conducting a draft of atmospheric gases through the central portion of the spray,

said cowling means having inlet and outlet openings positioned below the height and within the inner diameter of the chimney of liquid spray, and

fan means within said cowling means for mechanically generating a draft of gas through the inner portion of said frusto-conical liquid spray so that atmospheric gases are caused to travese the spray.

3,998,390

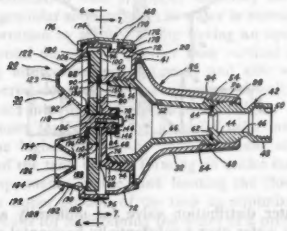
SELECTABLE MULTIPLE-NOZZLE SHOWERHEAD

Samuel F. Peterson, Chicago, and Alfons Rundzaitis, Beverly Shores, both of Ill., assignors to Associated Mills, Inc., Chicago, Ill.

Filed May 4, 1976, Ser. No. 682,988

Int. Cl.² B05B *1/08, 1/18, 1/12*

U.S. Cl. 239—394 28 Claims



26. An improved showerhead having at least one spray nozzle and being adapted to be connected with a source of water under pressure, the improved showerhead comprising:

a housing including means which defines a conduit through which water may flow and having a front end and a rear end which may be connected with the source of water under pressure and which communicates with the conduit means so that water from the source may flow through the conduit means from its rear end to its front end;

a disc member having a front surface and a rear surface and being connected with the front end of the housing so that the rear surface extends across and closes the front end of the housing and so that the water flowing in the conduit means communicates with the rear surface of the disc member, the disc member having a first circular aperture disposed therein and extending therethrough between the front surface and the rear surface;

a nozzle assembly including a front end wall and a rear end wall and being connected with the disc member so that the rear end wall of the nozzle assembly is positioned adjacent to the front surface of the disc member, with the front end wall of the nozzle assembly including a spray nozzle which is adapted to emit a pulsating spray of water; and with the rear end wall of the nozzle assembly having a circular nozzle aperture which has the same diameter as the first aperture and which is disposed so that its central axis is coaxial with the central axis of the first aperture and so that the nozzle aperture and the first aperture define an initial, continuous flow path for the water; the spray nozzle having an outer conical wall, an inner conical wall and a discharge orifice wall which, together the rear end wall of the nozzle assembly, define a turbulence cavity, with the discharge orifice wall having a discharge orifice therein through which the water being sprayed is emitted, with the central axes of the outer conical wall, the inner conical wall and the discharge orifice being coaxial and being offset from but parallel to the central axis of the nozzle aperture and with the plane of the discharge orifice wall being transverse to the central axis of the outer conical wall, the inner conical wall and the discharge orifice; the outer conical wall having its first, larger diameter end disposed adjacent to the rear end wall of the nozzle assembly and its second smaller diameter end disposed adjacent to the front end wall of the nozzle assembly; the inner conical wall being disposed generally within the outer conical wall and having its first, larger diameter end disposed adjacent to and connected with the second, smaller diameter end of the outer conical wall and its second, smaller diameter disposed within the turbulence cavity and between the first and second ends of the outer conical wall; the discharge orifice wall extending across, and except for the discharge orifice therein, closing the second, smaller diameter end of the inner conical wall.

3,998,391

FLOW RESTRICTOR AND TRICKLE EMITTER

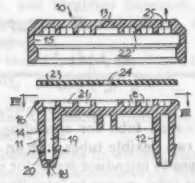
Moshe Lemelshtrich, 100 Petah Tikva Road, Tel Aviv, Israel

Filed Mar. 25, 1975, Ser. No. 561,978

Claims priority, application Israel, Mar. 26, 1974, 44502

Int. Cl.² B05B *15/00*

U.S. Cl. 239—542 18 Claims



1. A flow restrictor for use as an emitting member in drip or trickle irrigation systems, comprising:

a hollow platelike element, comprising two plate elements joined together matingly, in the interior of which is provided a conduit for flow, said conduit being provided in

the form of grooves in one or both of said plate members and having an inlet means for connecting to a feed line of water and at least one outlet leading out of said hollow platelike element, said conduit meandering from said inlet means to said outlet; and

a plurality of deflection means within said conduit for forcing the flow to perform several side-to-side bows and bends within stretches of said conduit intermediate said inlet means and said outlet;

wherein one of said plate members is provided with a plurality of ridges extending from one end of said plate member to near the opposite end thereof, depressions being formed between the ridges and wherein the other of said plate members is provided with walls defining channels into which the ridges of said first plate member can matingly enter, the bottom of the depressions in said first plate member being flush with the upper edges of the walls defining the channels in said second plate member.

9. A flow restrictor for use as an emitting member in drip or tricle irrigation systems, comprising:

a circular hollow platelike element in the interior of which is provided a conduit for flow, said conduit having an inlet means for connecting to a feed line of water and at least one outlet leading out of said element, said conduit meandering from said inlet means to said outlet; and

a plurality of deflection means within said conduit for the flow to perform several side-to-side bows and bends within stretches of said conduit intermediate said inlet means and said outlet;

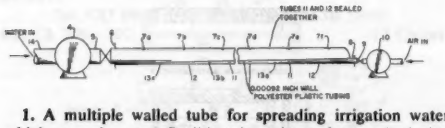
wherein said circular hollow platelike element comprises two circular plate elements and a circular partition element, wherein the inner face of each of said plate elements is provided with a groove, said inlet means leading into the groove in one of said plate elements and said outlet means leading from the groove in the other of said plate elements, said partition element having an aperture means therein for establishing communication between the end of the groove in said first member opposite said inlet means and the end of the groove in said second member opposite said outlet, said two plate elements being press-fitted into one another with said partition element therebetween.

3,998,392

EASILY MOVABLE IRRIGATION SPRINKLER SYSTEM

John Craig St. Clair, 1937 Summit St., Columbus, Ohio 43201

Filed Feb. 20, 1976, Ser. No. 659,785
Int. Cl.² B05B 1/20
U.S. Cl. 239—547 16 Claims



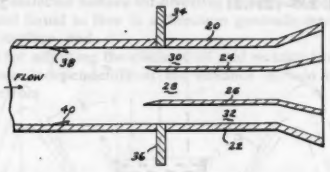
1. A multiple walled tube for spreading irrigation water which comprises: two flexible tubes with an inner tube inside an outer tube, means to introduce water for irrigation periodically into the inner tube, means to introduce air between the inner tube and the outer tube at other periods to force water out of the inner tube so that the combined tubes may be conveniently made lighter and moved from place to place, a seal between the inner and outer tubes, and a plurality of holes through the seal so that water in the inner tube will flow to outside the tubes and form a spray that will irrigate land.

3,998,393

SUPERSONIC DIFFUSER

James S. Petty, Greene County, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 20, 1976, Ser. No. 650,591
Int. Cl.² H01S 3/03; B05B 1/14, 1/30
U.S. Cl. 239—553.5 5 Claims



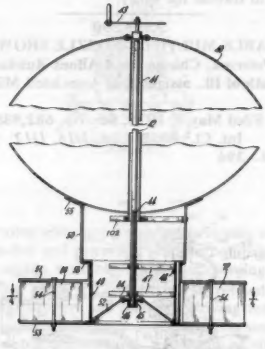
1. A variable geometry supersonic diffuser comprising: a multichannel shock duct diffuser having a rectangular shaped flow channel with inner walls forming two outer flow channels and a central flow channel; means for supplying a supersonic flow to said channel upstream of said inner walls; adjustable means adapted to close said two outer flow channels for causing a stable boundary layer flow separation from the wall of the rectangular shaped flow channel and a flow through said central channel; means for fixing the boundary layer separation point of the flow in said rectangular channel and means for stabilizing the flow reattachment to said inner walls.

3,998,394

WATER FLOW CONTROL VALVE AND DIFFUSER FOR CROSSFLOW COOLING TOWERS

John C. Ovard, Columbia, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.

Filed July 1, 1975, Ser. No. 592,307
Int. Cl.² A62C 37/20
U.S. Cl. 239—562 3 Claims



1. A water distribution valve for uniformly and equally distributing water over a substantially horizontal water basin having water distributing means positioned therethrough, said water being received from a substantially horizontal manifold pipe which comprises:

a. an inner valve cylinder open at both ends;

b. an upper valve body for concentrically receiving said inner valve cylinder;

c. drive means capable of slidably moving said inner valve

cylinder in said upper valve body from a closed to an open position and vice versa;

d. a lower valve body located below the upper valve body and forming with the upper valve body a 360° opening for water to flow therethrough when said inner valve cylinder is in an open position, said lower valve body having a water directing central portion and said lower valve body having said inner valve cylinder abut thereon when said valve is in a closed position;

e. a series of narrow baffles located on the inner surface of the lower valve body extending from said water directing central portion of lower valve body outward along the inner surface of said lower valve body and being disposed at arc distances from each other, said arcs being part of the circumference of the circle whose diameter is slightly larger than the diameter of the inner valve cylinder;

f. the lower valve body contains grooves for receiving said baffles.

3,998,395

LOW PROFILE SUMP WITH SUBMERGED TRANSVERSE ROLL CRUSHER

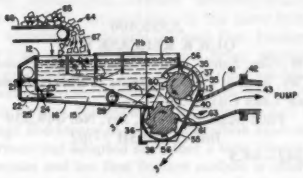
Ronald W. Umphrey, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Apr. 22, 1974, Ser. No. 462,828

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² B02C *23/36*

U.S. Cl. 241—46.11 **4 Claims**



1. In combination with a hopper assembly for forming a slurry of a granular solid product in water in restricted spaces for transportation by a slurry pump having an open-top tank with horizontal dimensions greater than vertical dimensions and having interconnected end walls and side walls and a bottom tapered downwardly toward one end wall; means for feeding water into the tank adjacent the higher end of the bottom; means for feeding the granular solid into the tank adjacent the higher end of the bottom; means adjacent the lower end of the tank bottom forming an outlet for the slurry to the pump; means in the tank limiting the flow of water through the upper portion of the tank to minimize wave action; and means for maintaining the water at a predetermined level in the tank; a crushing apparatus comprising

a. first and second cylindrical rolls each having a plurality of spaced peripheral teeth;

b. means for axially journaling said first and second cylindrical rolls in said outlet for the slurry pump; and

c. means for axially rotating said rolls to move substantially all of said product and water between said rolls and from said tank to said pump.

3,998,396

SCALPING APPARATUS FOR A LOW PROFILE TWO-ROLL CRUSHER

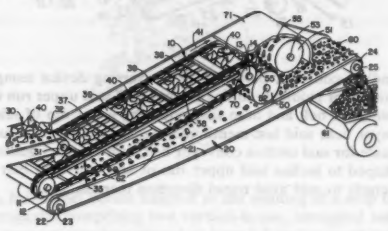
Ronald W. Umphrey, and David L. McCain, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Dec. 17, 1973, Ser. No. 425,462

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² B02C *23/08*

U.S. Cl. 241—81 **5 Claims**



1. A low profile apparatus for scalping and crushing products comprising first and second cylindrical roll crushers journaled so that the rotational axes of said first and second cylindrical rolls are parallel and having a first and second radius, respectively; an input conveyor and an output conveyor each having a products side and a return side; means for journaling said first cylindrical roll so that the distance from the axis of said first cylindrical roll to the products side of said output conveyor is slightly greater than the radius of said first cylindrical roll; means for mounting said input conveyor over said first cylindrical roll so that the distance between the axis of said first cylindrical roll and the return side of said input conveyor is slightly greater than the radius of said first cylindrical roll; means for journaling said second cylindrical roll above said first cylindrical roll so that the maximum height of said second cylindrical roll is at least equal to the height of the products side of said input conveyor and less than the maximum height of any products on said products side of said conveyor; means for mounting the input end of said input conveyor in substantially the same plane as said output conveyor; means for mounting said output conveyor under said input conveyor; and scalping means for passing product of a predetermined maximum size or smaller from said input conveyor to said output conveyor said input conveyor conveying product above said predetermined size to said first and second roll crushers wherein it is sized and passed to said output conveyor.

3,998,397

COIL TRANSPORTING DEVICE

Egon Haberkorn, and Siegfried Demandt, both of Rheydt, Germany, assignors to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Oct. 21, 1974, Ser. No. 516,602

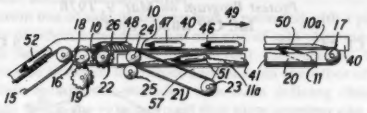
Claims priority, application Japan, Oct. 22, 1973, 48.118863

Int. Cl.² B65H *67/06, 54/22*

U.S. Cl. 242—35.5 A **6 Claims**

1. Device for feeding cops to winding stations of a winding machine comprising an endless conveyor belt traveling in axial direction past the winding stations and feeding thereto, as needed, cops carried by a forward traveling upper run of said conveyor belt, said endless conveyor belt having a reversing location beyond the last winding station of the machine, a first reversing device located between the last winding station and the reversing location of said conveyor belt, said first reversing device having means for removing from said forward traveling

upper run of said endless conveyor belt cops which had not been fed to the winding stations and for depositing the cops on a returning lower run of said endless conveyor belt, a second reversing device in vicinity of said returning lower run, said second reversing device having conveyor belt means for removing the cops from said returning lower run, and for transferring the cops to said forward traveling upper run of said



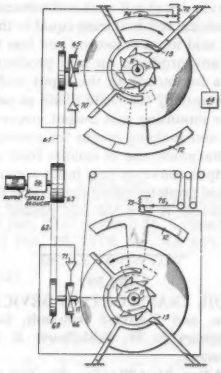
endless conveyor belt, said first reversing device comprising means for guidingly rolling the cops off said upper run of said conveyor belt and onto said returning lower run of said conveyor belt, said last-mentioned means including an auxiliary guide for said endless conveyor belt, said auxiliary guide being shaped to incline said upper run of said conveyor belt transversely to said axial travel direction thereof.

3,998,398

APPARATUS WINDING ENDLESS BANDS OF FILM ON HUBS OF SPOOLS

Didier Kressmann, 43 rue de Chaillot, 75016 Paris, France

Filed Nov. 19, 1975, Ser. No. 633,383
Int. Cl.² G03B 21/00
U.S. Cl. 242—55.16 **14 Claims**



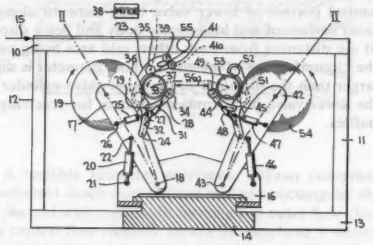
1. In combination, a hub and a mechanism for winding endless bands of film on said hub, said hub being hollow and open at one side thereof and including a circumferential rim, said rim being provided with a plurality of apertures, said mechanism including a pivotal arm with a finger thereon, said finger being adapted for engaging the film and being introducible into the hub through one said aperture thereof to form a loop of film within said hub, and cam means on said rim adjacent said apertures for engaging said finger when the latter is offset from the respective said aperture to pivot the hub so the finger can be smoothly and directly introduced into the aperture.

3,998,399

WEB CUTTING AND REWIND MACHINE

Franz Held, Gross Zimmern; Jorg Glockner, Seeheim, and Horst Zimmer, Griesheim, all of Germany, assignors to Maschinenfabrik Goebel, GmbH, Darmstadt, Germany

Filed Apr. 5, 1976, Ser. No. 673,362
Claims priority, application Germany, Apr. 5, 1975, 2514876
Int. Cl.² B65H 17/08
U.S. Cl. 242—65 **10 Claims**



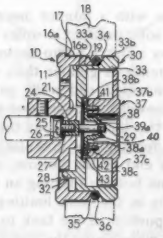
1. A machine for rewinding a plurality of strips longitudinally cut from a continuous web, comprising: roll means; at least two rewind elements on which said strips can be respectively wound into rolls of predetermined axial dimensions; a pair of feed drums, each of a predetermined axial dimension, in peripheral engagement with said rolls; said roll means, rewind elements and feed drums being positioned for permitting a pair of said strips to pass through said roll means, over a respective feed roll and onto a respective element to form rolls; mounting means adjacent opposite ends of each of said elements along a direction parallel to the axes of said feed drums; and means for mounting said drums being respectively connected to said element mounting means; whereby strips can be wound into rolls of axial dimensions less than said predetermined dimensions upon a shifting together of said mounting means to lie adjacent the opposite ends thereof.

3,998,400

QUICK RELEASE HUB

Richard W. Gee, Sandy, and William Bushly Hammond, Salt Lake City, both of Utah, assignors to Sperry Rand Corporation, Salt Lake City, Utah

Filed Mar. 24, 1976, Ser. No. 669,939
Int. Cl.² B65H 17/02
U.S. Cl. 242—68.3 **10 Claims**



1. A hub for mounting a reel, comprising in combination;
a first circular plate having an extension about its outer periphery forming a first circumferential surface,
a second circular plate disposed relative to said first plate having an extension about its outer periphery forming second and third circumferential surfaces,
said first and third circumferential surfaces being in sub-

stantially the same plane and having first means forming with said second circumferential surface a V-shaped groove having a width which varies when the relative position of said first and second plates vary,

an expandable O-ring disposed within said V-shaped groove remaining below said first and third circumferential surfaces when said first and second plates are in a first relative position and extending beyond said first and second circumferential surfaces when said first and second plates are in a second relative position,

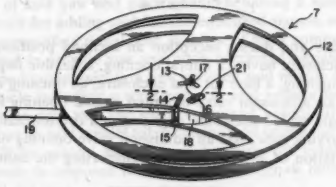
second means connected to said first and second plates for moving said first and second plates to said first and second relative positions.

3,998,401

TAPE REEL WITH TAPE-ATTACHING MECHANISM

Richard R. Fink, 31 Kinnan Way, Basking Ridge, N.J. 07920

Filed Oct. 1, 1975, Ser. No. 618,481
Int. Cl.² B65H *75/28*
U.S. Cl. 242—74.1 **9 Claims**



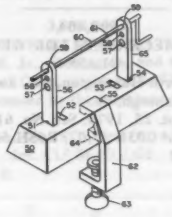
1. A reel tape securing device comprising in combination: a tape reel means for winding and storing tape thereon and for securely anchoring releasably an inner end of stored tape, said tape reel means including an inner hub structure defining a substantially open-ended radially inwardly-extending slit opening in a radially-outward face of the inner hub, and the inner hub structure including a fixed first friction surface forming at least a part of said slit and being adapted to frictionally engage and retain tape pressed thereagainst, and the tape reel means further including a lever means opposite said first friction surface, for imparting a predetermined mechanical advantage and torque in a clamping action against said first friction surface and adapted such that a tape placed between the lever means and the first friction surface is intermittently and releasably retainable, the lever means further including a handle element mounted movably of the lever means within hub inner space defined by the inner hub structure, said lever means including a wedge element having a second friction surface positioned in opposing relationship to said first friction surface, the wedge element being mounted within said inner hub's inner space at a position permitting wedging movement of the second friction surface in a wedging direction radially outwardly with an axis of said wedging movement defining an acute angle between the direction of wedging movement and the first friction surface, thereby adapted such that clamping torque of the second friction surface against said first friction surface increases when a tape end engaged clampingly is subjected to a withdrawal force resulting from a rotary movement of the inner hub structure in a forward take-up predetermined direction, and the handle element being movable of the wedge element intermittently in an opposite non-wedging direction moving the second friction surface away from the friction surface, thereby the handle being releasable of said torque otherwise clampingly present against the first friction surface when the withdrawal force is placed upon the tape end.

3,998,402

HAND WINDING DEVICE

Lyle E. Christensen, Kingston, and C. Dana Soucie, North Hampton, both of N.H., assignors to BeMor International, Inc., North Hampton, N.H.

Filed Apr. 19, 1976, Ser. No. 678,204
Int. Cl.² B65H *17/52*
U.S. Cl. 242—106 **4 Claims**



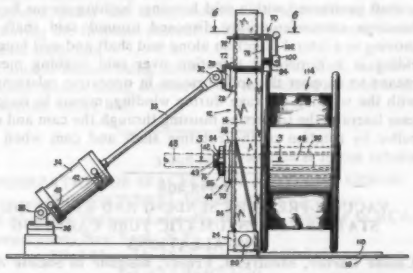
1. A handicraft device adapted to the winding of a strip of sheet material comprising two vertical-in-use, elongated and facing support members spaced at least 1.5 inches apart and having matching holes in the upper ends thereof adapted to support at least two winding spindles, each of a different diameter; a winding spindle adapted to be removably mounted for rotation in one pair of said matching holes, said winding spindle having a finger-operable crank handle on one end thereof and having a longitudinal split therein adapted to accommodate one end of said strip; a base of a molded plastic and having a pair of sockets adapted to receive and mount said support members and having a slot therein adapted to receive a mounting clamp; and a mounting clamp adapted to fit on to said base with the upper end of said mounting clamp mating with said slot and adapted to affix the base to the edge of a table.

3,998,403

SUPPORTING FIXTURES FOR WIRE-CARRYING SPOOLS

Joseph J. Kovaleski, c/o Wyrepak Ind., Inc., 136 James St., Bridgeport, Conn. 06604

Filed Oct. 7, 1975, Ser. No. 620,319
Int. Cl.² B65H *49/00*
U.S. Cl. 242—129.72 **15 Claims**



1. A tilt mounting device for holding wire-filled spools in a tilted position with their axes located angularly with respect to the horizontal, comprising in combination:

a. an articulated stand comprising a generally flat base adapted to rest on a supporting surface and an upstanding post pivotally secured to the base,

b. said base being arranged to enable a wire-filled spool to be rolled on it with one end of the spool adjacent said post,

c. cooperable means on said stand, including a clamping jaw engageable with a flange of the spool to be mounted, said jaw being slidably carried by said post, for gripping the spool at one end thereof, said means enabling the other end of the spool to remain free and unattached, and

d. means carried by the post, enabling the latter and the gripped spool to be pivotally swung with respect to the base so as to tilt the spool through an angle where the axis of the spool is inclined to the horizontal.

3,998,404

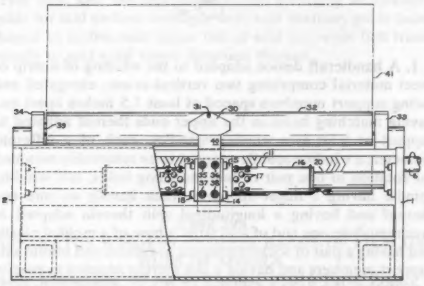
TRANSVERSE MECHANISM FOR WINDING FIBER GLASS

Walter J. Reese, North Huntington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 25, 1975, Ser. No. 616,715

Int. Cl.² C03B *37/02;* **B65H** *57/28*

U.S. Cl. 242—158.3 **8 Claims**



2. An apparatus for traversing strand while it is being wound on a package comprising a rotating winder having a motor associated therewith, roller means associated with said winder and spaced therefrom, said roller means generally conforming on its long axis to the long axis of the winder surface, a traversing means connected to the motor, means associated with the motor to drive a rotating shaft on which the traversing mechanism is mounted, said traversing mechanism comprising a rotating shaft having affixed thereto a cam rotatable therewith, said cam being provided with longitudinal grooves on its external surface, a cam shoe constructed and arranged to ride in said grooves with an associated cam roller, a housing carrying a guide eye at one end on the external surface thereof which, when in position, is located above the winder surface, a shaft positioned within said housing, bushing means having bearings circumferentially disposed around said shaft for moving in a lateral direction along said shaft and said housing riding in a horizontal direction over said bushing means, means to support the roller means in operative relationship with the winding package during winding, means to reciprocate laterally the traversing housing through the cam and cam roller by rotation of the rotating shaft and cam when the winder motor is actuated.

3,998,405

VACUUM-PRESSURE SENDING AND RECEIVING STATION FOR PNEUMATIC TUBE CARRYING INSTALLATIONS

Claude Carlier, Montreuil, France, assignor to Societe Anonyme Saunier Duval, Montreuil, France

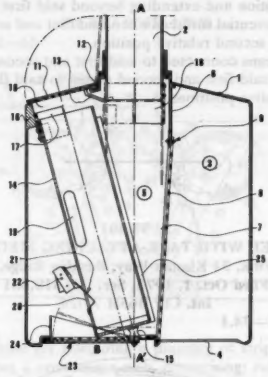
Filed Nov. 26, 1975, Ser. No. 635,767

Claims priority, application France, Nov. 27, 1974, 74.38783

Int. Cl.² B65G *51/26*

U.S. Cl. 243—19 **7 Claims**

1. A vacuum-pressure sending and receiving station for pneumatic line transporting systems comprising a sealed enclosure, a container carrying tube disposed in said sealed enclosure at the end of a vertical terminal section of a pneumatic transporting line, said container carrying tube rotating on a horizontal axis during sending of the container bringing the container into a substantially vertical position opposite the vertical terminal section of the transporting line, said container carrying tube occupying during sending a vertical position in extension of the vertical terminal section of the transporting line and during reception an inclined position, said sealed enclosure having a lateral opening, a flexible flap closing said opening, a base for said enclosure, an opening in said base, an air admission valve mounted in said opening in said base of said sealed enclosure engaging and rotating said container carrying tube, said air admission valve opening only by the circulation of air required for transporting the container.



3,998,406

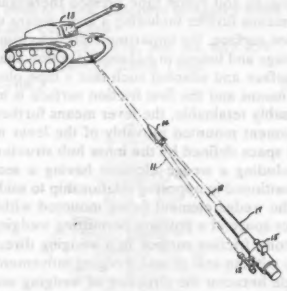
GUIDED MISSILE SYSTEM

Carl H. Smith, Newport Beach; Louis G. Walters, and Eric Durand, both of Santa Ana, all of Calif., assignors to Aeronutronic Ford Corporation, Blue Bell, Pa.

Filed May 28, 1964, Ser. No. 371,048

Int. Cl.² F41G *7/00;* **F42B** *15/02;* **G06F** *15/50*

U.S. Cl. 244—3.14 **6 Claims**



1. A missile guidance system for continuously guiding a missile along a line of sight between a vehicle and a target comprising,

tracker means which is located solely on said vehicle, includes a radiation-sensitive element, and is responsive to the impingement of radiant energy on said element to generate signals indicative of the direction of impingement of said radiant energy on said element, relative to the orientation of said element,

a source of radiant energy, positioned on said missile,

means, located solely on said vehicle and operable by a

human operator, for locating said element of said tracker means in an orientation and position which bears a fixed spatial relationship to said line of sight,

said tracker means, when said element is so oriented and positioned and impinged by radiant energy from said source, being adapted to generate yaw signals indicative of the deviation in azimuth of said source with respect to said line of sight and being also adapted to generate pitch signals indicative of the deviation in elevation of said source with respect to said line of sight,

said source and said tracker means comprising a first communications link between said missile and said vehicle,

a guidance and control computer in said vehicle having a yaw channel responsive to said vehicle tracker yaw signals and having a pitch channel responsive to said vehicle tracker pitch signals,

each of said yaw and pitch channels having an equalizer network responsive to the respective yaw and pitch signals from said vehicle tracker to equalize said yaw and pitch signals,

each of said yaw and pitch channels having means for limiting said equalized signal in each said channel,

a computer programmer for generating a gain compensating signal proportional to the missile flight time, and a line of sight compensating signal proportional to target motion at right angles,

each of said yaw and pitch channels having a summation circuit for adding said limited equalized signals, said gain compensating signal, and said line of sight compensating signal to provide yaw and pitch command signals,

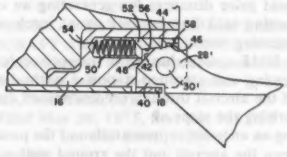
a second communication link between said missile and said vehicle including a transmitter in said vehicle for transmitting said yaw and pitch command signals, and a receiver in said missile for receiving said command signals,

and flight control means in said missile for guiding said missile in response to said command signals received by said receiver.

3,998,407
FOLDING TAIL FINS

Ivan L. Marburger, Upland, Calif.; Donald E. Howlett, Reno, Nev., and Lawrence J. Nagel, La Verne, Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 493,005, July 30, 1974, Pat. No. 3,946,969. This application Dec. 4, 1975, Ser. No. 637,601
Int. Cl.² F42B *13/32*
U.S. Cl. 244—3.28 **1 Claim**



1. A flip out tail assembly for a missile comprising:

pairs of lugs extending rearwardly from said missile, said missile having a diagonal flat surface at the rear thereof;

four fins each having a hinged hub portion pivotally secured between said pair of lugs, each said hinged hub portion having a first flat surface and a second flat surface inclined at an angle thereto, a lug disposed on said second flat surface and projecting upwardly therefrom;

a plunger slidably mounted in the rear of said missile adjacent each said pair of lugs; each said plunger having an outwardly facing flat surface having a recess at the rearmost end thereof;

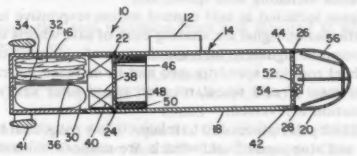
spring means for biasing said plunger against said hinged hub portion whereby said fin is pivoted outwardly so that said lug on said hinged hub portion enters said recess on said plunger and said first flat surface of said hub portion engages said diagonal surface of the rearend of said missile for retention of said fin in the extended position; and

a shroud assembly fixed to said missile and having four longitudinal slots formed therein through which the fins are adapted to project.

3,998,408
REMOTE ELEVATED PLATFORM

Hamlin A. Caldwell, Jr., Stonington, and Gerald M. Mayer, East Lyme, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 19, 1976, Ser. No. 659,458
Int. Cl.² B64D *1/02*
U.S. Cl. 244—138 R **6 Claims**



1. A remote elevated platform system for positioning a payload at a high altitude and maintaining the position thereof unattended, which comprises:

a housing including a plurality of detachably secured shells;

a parafoil being stowed in a first shell of said plurality of shells, said parafoil being flexibly attached to the payload in said first shell;

a pressure release switching means being housed in said first shell, said pressure release switching means being energizable by a preselected barometric pressure value;

a first spool being housed in said first shell;

a first tether line being mounted on said first spool having the first end thereof being connected to the payload;

a second shell of said plurality of shells of said housing detachably secured to said first shell, said second shell being connected to the second end of said first tether line;

a third shell of said plurality of said shells of said housing detachably secured to said second shell;

an impact switching means being housed in said third shell;

a second spool being housed in said third shell;

a second tether line being mounted on said second spool having the first end thereof being connected to said second shell; and

an anchor means being housed in said third shell, said anchor means being connected to the second end of said second tether line.

3,998,409
MINIMIZATION OF SPACECRAFT ATTITUDE ERROR DUE TO WHEEL SPEED REVERSAL

Josef Siegfried Pistiner, Lafayette Hill, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 11, 1975, Ser. No. 557,318
Int. Cl.² B64G *1/20*
U.S. Cl. 244—165 **22 Claims**

1. An attitude control system for a substantially zero momentum satellite having three mutually perpendicular axes, comprising:

a. attitude determination means mounted on said satellite for detecting deviations of each of said mutually perpendicular axes from a predetermined reference attitude and generating attitude error signals in response to said detected deviations of said predetermined attitude;

b. first reaction wheel, second reaction, and third reaction wheels, each of said wheels mounted on said satellite on a respective axis parallel with a respective one of each of said three mutually perpendicular axes, each of said wheels being rotationally di-directional;

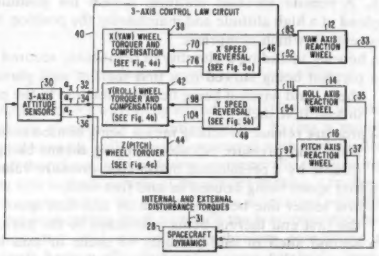
c. control means responsive to said attitude error signals for generating three torque command signals each associated with a respective one of each of said three wheels, each of said torque command signals causing the associated one of said respective wheels to develop control torques and rotate at an angular velocity and direction of rotation to correct and reduce substantially to zero any deviations that are detected;

d. means responsive to a threshold value of speed of each of said wheels for generating an anticipation signal manifesting an anticipated reversal of rotation of a given wheel;

e. said deviations from a predetermined reference attitude including deviations caused by torques generated by any of said wheels when operating at relatively low rotational speeds including zero speed, and

f. means included in said control means responsive to said anticipation signal for altering each of said wheels torque command signals to increase the rate of reduction of said wheel rotation speed to zero and to increase the rate of increase of said wheel rotation speed after said wheel rotation is reversed,

whereby deviations due to relatively low rotational speeds and stoppage of said wheels are reduced substantially to zero.


3-AXIS CONTROL LAW CIRCUIT
X (YAW) WHEEL TORQUER AND COMPENSATION (SEE Fig. 4a)
X SPEED REVERSAL (SEE Fig. 5a)
YAW AXIS REACTION WHEEL
3-AXIS ATTITUDE SENSORS
Y (ROLL) WHEEL TORQUER AND COMPENSATION (SEE Fig. 4b)
Y SPEED REVERSAL (SEE Fig. 5b)
ROLL AXIS REACTION WHEEL
Z (PITCH) WHEEL TORQUER (SEE Fig. 4c)
PITCH AXIS REACTION WHEEL
INTERNAL AND EXTERNAL DISTURBANCE TORQUES
SPACECRAFT DYNAMICS

15. A method for controlling the attitude of a substantially zero momentum satellite having three mutually perpendicular axes and first, second, and third rotationally bi-directional reaction wheels each mounted on said satellite on a respective axis parallel with a respective one of each of said three mutually perpendicular axes, comprising the steps of:

a. detecting deviations on each of said mutually perpendicular axes from a predetermined reference attitude;

b. generating attitude error signals corresponding to said detected deviations;

c. generating three torque command signals as a function of said attitude error signals, each of said torque command signals associated with a respective one of each of said three mutually perpendicular wheels, each of said torque command signals causing the associated one of said respective wheels to develop control torques and rotate at an angular velocity and direction of rotation to correct and reduce substantially to zero any deviations that are detected;

d. comparing the speed of each of said three wheels to a threshold value of speed;

e. generating in response to said comparing step for speeds equal to or less than said threshold value an anticipation signal manifesting an anticipated reversal of rotation of a given wheel; and

f. altering each of said wheel torque command signals in response to said anticipation signal to increase the rate of reduction of said wheel rotation speed to zero and to increase the rate of increase of said wheel rotation speed after said wheel rotation is reversed,

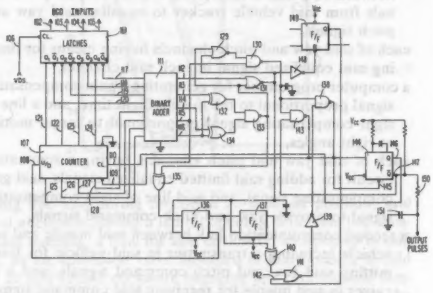
whereby deviations due to relatively low rotational speed and stoppage of said wheels are reduced substantially to zero.

3,998,410

APPARATUS AND METHOD FOR DETECTING A DIGITAL CHANGE IN DATA

Frank Patterson Smith, 2nd, Dresher, Pa., assignor to Narco Scientific Industries, Inc., Fort Washington, Pa.

Filed Oct. 28, 1975, Ser. No. 625,880
Int. Cl.² G06F *15/50*; G06G *7/78*
U.S. Cl. 244—183 **12 Claims**



1. In a DME system, apparatus, in an aircraft communicating with a ground station, for evaluating passage of the aircraft through predetermined distance intervals comprising:

a. means for storing an encoded representation of the present distance between the aircraft and the ground station, increments in the encoded representation corresponding to said intervals;

b. counting means for storing a representation of prior aircraft to ground station distance, said counting means being incremented by a first control signal in a sense established by a second control signal;

c. means for developing an encoded difference between said present and said prior distances;

d. means, responsive to the sense of said difference, for developing said second control signal; and

e. means, responsive to an inequality between said present and said prior distance, for generating an output pulse comprising said first control signal, each output pulse representing one of said intervals.

7. In a DME system having a transceiver in an aircraft communicating with a ground station, a method of evaluating passage of the aircraft through predetermined distance intervals comprising the steps of:

a. storing an encoded representation of the present distance between the aircraft and the ground station, increments in the encoded representation corresponding to said intervals;

b. storing a representation of prior aircraft to ground station distance, said prior representation being incremented by a first control signal in a sense established by a second control signal;

c. developing an encoded difference between said present and said prior distances;

d. developing said second control signal in response to the sense of said encoded difference; and

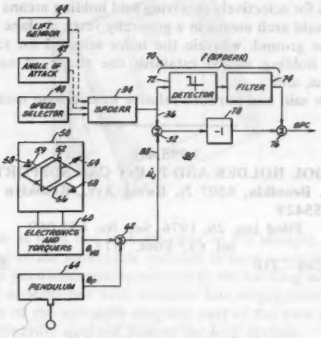
e. generating an output pulse comprising said first control signal in response to an inequality between said present and said prior distance, each output pulse representing one of said intervals.

3,998,411

SPEED OVERSHOOT CORRECTION SYSTEM

Frederick C. Blechen, Long Beach, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 17, 1976, Ser. No. 658,367
Int. Cl.² G05D 1/12
U.S. Cl. 244—188 10 Claims



1. Apparatus for compensating for errors in aircraft control signals resulting from gyroscope signal errors developed during long term decelerations, which apparatus comprises:

a control signal source;

means for providing a derived acceleration signal for combination with the control signal;

an input summing stage connected to develop a composite signal from a combination of the control signal and the derived acceleration signal;

a second summing stage connected to provide an output signal for controlling the aircraft;

a signal inverter connected between the output of the first summing stage and an input of the second summing stage; and

a compensation channel connected between the control signal source and a second input to the second summing stage for providing a compensation signal at the second summing stage to correct for a vertical gyro error component in the signal at the first input of the second summing stage.

3,998,412

HELICAL VERTICAL PATH CONTROL APPARATUS FOR AIRCRAFT AREA NAVIGATION SYSTEM

Donald H. Baker; Larry J. Bowe, both of Phoenix, and William C. Post, Scottsdale, all of Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

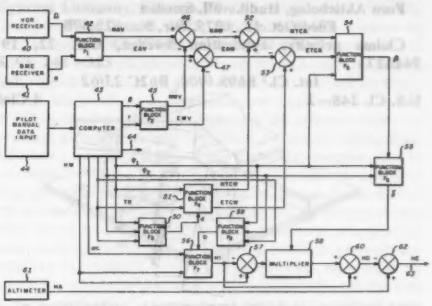
Filed May 29, 1975, Ser. No. 581,988
Int. Cl.² B64C 13/20
U.S. Cl. 244—189 16 Claims

1. In an area navigation system for aircraft, apparatus for controlling the vertical flight path of the aircraft when executing a transition from an inbound course to an outbound course of a waypoint having an altitude associated therewith, said inbound and outbound courses defining waypoint inbound and outbound legs respectively, comprising

lateral transition path control means for laterally controlling said aircraft to execute said transition from said inbound to said outbound leg,

helical path computing means for computing a helical vertical flight path from said inbound leg to said outbound leg and intersecting said waypoint altitude at the beginning of said outbound leg, and

deviation signal generating means for generating deviation signals with respect to said helical vertical path for constraining said aircraft to fly said helical vertical path in



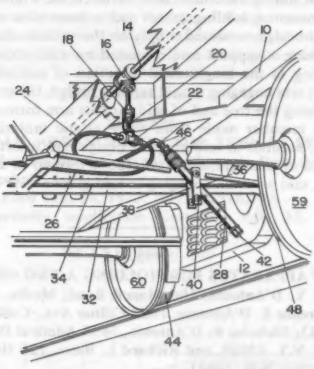
executing said transition from said inbound to said outbound leg.

3,998,413

PROTECTIVE SAFETY APPARATUS FOR RAILWAY CARS

John M. Mygatt, 5479 Aqua St., Columbus, Ohio 43229, and William T. Donohue, Box 265 R.R. 1, Amanda, Ohio 43102

Filed Aug. 21, 1975, Ser. No. 606,413
Int. Cl.² B60T 7/12; B61H 11/02
U.S. Cl. 246—172 4 Claims



1. An apparatus for detecting a derailment of a railway car having an air brake system, including a longitudinally extending train line air brake pipe for series connection to the air brake pipes of other railway cars, and for automatically initiating the emergency braking of said cars, said apparatus comprising:

a. a pair of frangible tubes mounted to and downwardly extending from opposite sides of the center of each truck of said car laterally inwardly of and longitudinally intermediate wheels which are journalled to said truck, each of said tubes mounted to a brake bar of said truck and having a closed lower end and positioned offset from alignment with the track engaging surface of said wheels;

b. flexible air hose means connected between said tubes and the air brake pipe of said car for providing sealed air communication between each of said tubes and the air brake system of the car; and

c. a manually operable air valve interposed in the sealed air communication between said air brake pipe and said tubes;

whereby a rupture of one of said tubes or air hose means vents air to the atmosphere.

3,998,414

BRIDGE FOR LOADING CRANES

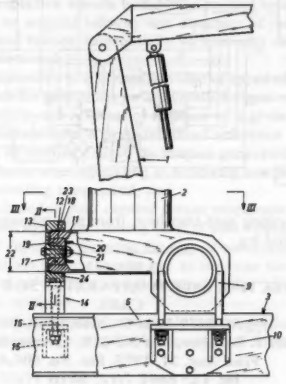
Jan Birger Palmcrantz, Harmanger, Sweden, assignor to Hiab-Foco Aktiebolag, Hudiksvall, Sweden

Filed Oct. 15, 1975, Ser. No. 622,678

Claims priority, application Sweden, Oct. 22, 1974, 7413273

Int. Cl.² B60S 9/00; B62C 23/62

U.S. Cl. 248—2 4 Claims



1. An improved connection between the crane base of a truck-mounted loading crane and a transverse stay, called support bridge, mounted solidly on the vehicle chassis frame, comprising a support arm mounted on said crane base and extending in the longitudinal direction of said vehicle, said support arm engaging in said support bridge, the improvement comprising the free end of said support arm formed as a hub, a joint member made from some elastic material, such as rubber, secured in said support bridge and inserted into the hub end of said arm, a lateral groove formed in said support bridge, said arm end engaging in said groove with some clearance.

3,998,415

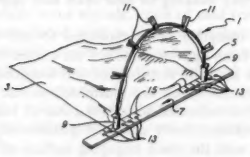
APPARATUS FOR HOLDING A BAG OPEN

Joseph V. D'Antonio, 106 Mancil Road, Media, Pa. 19063; Lawrence E. D'Antonio, 1000 Clifton Ave., Collingdale, Pa. 19023; Nicholas F. D'Antonio, 7695 Admiral Drive, Liverpool, N.Y. 13088, and Richard L. Bates, 125 Hillside Way, Camillus, N.Y. 13031

Filed Mar. 6, 1975, Ser. No. 556,094

Int. Cl.² B65B 67/12

U.S. Cl. 248—101 4 Claims



1. Apparatus for holding open in a generally vertical position, the mouth of an open-ended collapsible container horizontally disposed on the ground, said apparatus comprising:

curvilinear, flexible arch means dimensioned to have attached thereto a part of the periphery of the open end of the collapsible container, said arch means having generally opposing end portions;

securing means for securing said part of the periphery of the open end of the collapsible container to said arch means;

holding means for receiving the end portions of said arch means and

base means for pressing the part of the periphery of the open end of the collapsible container extending directly between the end portions of said arch means against the ground, said base means including a plurality of spaced holes for selectively receiving said holding means to position said arch means in a generally vertical plane relative to the ground, wherein the holes selected for receiving said holding means establish the shape of said arch means; and

position said end portions relative to said base means.

3,998,416

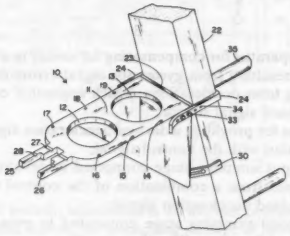
TOOL HOLDER AND PAINT CAN SUPPORT

James R. Benolkin, 6507 N. Ewing Ave., Brooklyn Center, Minn. 55429

Filed Jan. 26, 1976, Ser. No. 652,069

Int. Cl.² E06C 7/14

U.S. Cl. 248—210 5 Claims



1. A tool and paint can holder for mounting on a ladder rail comprising:

a holding member having a first surface for abutting against a ladder rail and a second surface having an opening therein for receiving tools, a pair of fingers projecting from said holding member, said pair of fingers having means for holding a paint pail thereon, said fingers spaced sufficiently apart to engage the handle of a brush so that a brush can be hung, bristles down, over a paint pail mounted in said means on said fingers;

a guide member, movable, mounted to said holding member for engaging a ladder rail to thereby secure said second surface of said holding member in a horizontal position;

an elastic member connected to said holding member for encircling said ladder rail and mounting said holding member to the ladder rail, said elastic member self-tightening as said second surface of said holding member is positioned in a horizontal position.

3,998,417

BACKING MEMBER

Arne P. Darnell, Urshult, Sweden, assignor to Perstorp AB, Perstorp, Sweden

Filed May 14, 1975, Ser. No. 577,458

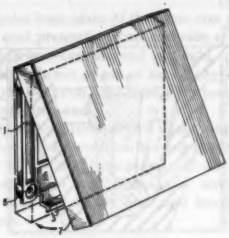
Claims priority, application Sweden, June 28, 1974, 7408536

Int. Cl.² A47F 5/00

U.S. Cl. 248—222.2 4 Claims

1. A backing member adapted to be fixed to a vertically extending supporting surface for supporting a mountable member, having substantially straight right-angled sides, thereon, said backing member being made of plastic and comprising a substantially rectangular plate having four corners, an outwardly and then upwardly directed lock edge at the top of the plate, two outwardly and then downwardly

directed lock springs at the bottom of the plate and a breakable distance ear projecting from each of the four corners of the plate whereby the distance ears can be used to fix the position of the backing member and can thereafter be broken off, the lock edge and the lock springs being adapted to en-



gage with at least one lock member on the straight, right-angled sides of the mountable member in such a way that it can be firmly yet dismountably secured to the backing member by pressing at least one lock member into engagement with at least one of the upwardly directed part of the lock edge and the downwardly directed part of the lock springs.

3,998,418

LANTERN HOLDER

Peter F. Boulanger, Elm St., Box 458, Kincaid, Ill. 62540

Filed Nov. 22, 1974, Ser. No. 526,077

Int. Cl.² A47F *5/00;* **F21L** *15/10, 19/00*

U.S. Cl. 248—309 R **4 Claims**

1. A lantern holder for supporting a lantern having a bail in a substantially upright position above an oarlock of a boat, said lantern holder comprising

a substantially rod-like post of substantially linear configuration bent near one end thereof at an obtuse angle with the remainder of the length thereof and dimensioned at the one end to be accommodated in an oarlock of a boat, the area of the one end of the post being externally threaded, said post having a slot formed therein at the other end thereof and extending substantially diametrically for accommodating the bail of a lantern whereby the post is adapted to support a lantern in substantially upright position above an oarlock of a boat;

a first bore formed through the other end of the post extending substantially diametrically and perpendicularly to the slot and intersecting said slot; and

a lock pin removably passing through the first bore to prevent the bail of the lantern from slipping out of the slot of the post.

3,998,419

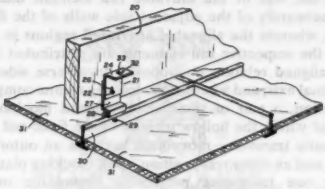
SWIVEL TYPE HANGER BRACKET

Ralph P. Semmerling, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,457

Int. Cl.² E04B *5/54;* **E04G** *17/18*

U.S. Cl. 248—323 **1 Claim**



1. In combination, a supporting structure, a swivel type hanger, and inverted-T runner, and ceiling tile supported by the inverted-T runner, said swivel type hanger comprising an L-shaped connection piece having at least one slot in a face thereof, a swivel flange having at least one slot therein and partially encircled at the bottom thereof by a clip for spacing apart the inverted-T runner and flange while attaching the inverted-T runner to the flange through the clip, said swivel flange having an L-shaped portion, and a connector connecting the L-shaped connection piece and the swivel flange through a slot therein, said connection being adjustable and useful in adjusting the location of the ceiling tile supported by the inverted-T runner, said connector having an L-shaped upper portion for contacting the swivel flange near the L-shaped portion of the swivel flange, and said connector having a U-shaped bottom portion partially encircling the bottom of the swivel flange.

3,998,420

GUIDE RAIL ARRANGEMENT FOR VEHICLE SEATS

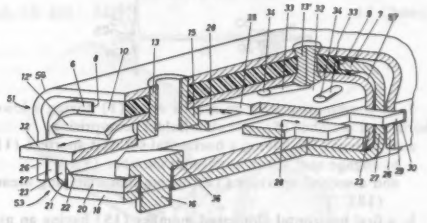
Josef Schaefer, Solingen, Germany, assignor to Bremshey Aktiengesellschaft, Solingen, Germany

Filed Feb. 10, 1975, Ser. No. 548,793

Claims priority, application Germany, Feb. 13, 1974, 2406685

Int. Cl.² F16M *13/00*

U.S. Cl. 248—429 **7 Claims**



1. In an apparatus for effecting limited displacement of a vehicle seat in a longitudinal direction within the vehicle, comprising first and second interleavable hollow guide rail means individually associated with the vehicle seat and with the vehicle, respectively, the first guide rail means comprising a first downwardly opening U-shaped rail element having a cross-piece and a pair of opposed, side wall-defining legs, the second guide rail means comprising a second rail element having a top surface and a pair of side wall defining legs individually extending adjacent the legs of the fixed guide rail elements, the first and second guide rail means having alignable apertured regions in a pair of adjacent side walls thereof, means mounting the first guide rail element for longitudinal

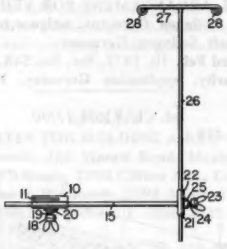
movement with respect to the second guide rail elememt, and means movable transversely to the apertured regions for selectively locking the first and second guide rail elements against relative movement when such regions are aligned, the improvement wherein the top surface of the fixed rail element extends inwardly from the side walls thereof to define a self-contained, essentially hollow interior of the fixed rail element; wherein the legs of the movable rail element individually extend outwardly of the adjacent side walls of the fixed rail element; wherein the alignable apertured regions in the side walls of the respective rail elements are distributed in transversely aligned relation on opposite transverse sides of the longitudinal axis; and wherein the locking means comprises, in combination, a pair of transversely aligned blocking plates supported within the hollow interior of the fixed rail element for opposite transverse movement between an outer locking position and an inner rest position, each blocking plate having at least one transverse projection extendable outwardly through the apertured regions in the adjacent ones of the fixed and movable rail elements when such plate is in the outer position, blocking control means supported for longitudinal movement within the hollow interior of the fixed rail element, and camming means individually coupling the blocking plates to the blocking control means for transversely moving the blocking plates in opposite transverse directions between their inner and outer positions, respectively, upon a reciprocation of the blocking control means in the longitudinal direction.

3,998,421

AUXILIARY HOLDER

Arden L. Clemison, 1452 W. 183rd St., Gardena, Calif. 90248

Filed Jan. 30, 1976, Ser. No. 653,812
Int. Cl.² A47B 97/04
U.S. Cl. 248—441 B **9 Claims**



1. In combination with an artist's easel (1) having a lower horizontal member (5), a sketch holder, comprising;

a. a fitment (10) having a horizontal slit first aperture (11) to engage said lower horizontal member (5) and a second aperture (12) having first clamping means (18),

b. a first horizontal elongated member (15) having an axis and being disposed within said second aperture, clampable by said first clamping means, and having a third aperture (21) at an angle to the axis of said first elongated member at one extremity thereof, said third aperture having second clamping means (23),

c. a second vertical elongated member (26), being disposed within said third aperture and clampable by said second clamping means, and

d. a third horizontal elongated member (27) affixed to the top extremity of said second elongated member at essentially a right angle,

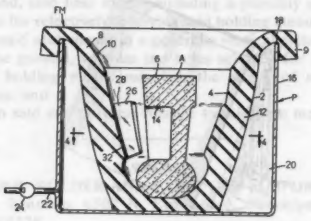
whereby a substantially planar sketch can be supported against said second and third elongated members at a selectable distance and inclination to said easel.

3,998,422

FLEXIBLE MOLD HAVING INTERNAL SEAMS

Raymond M. Putzer, Racine, Wis., assignor to Precision Flexmold, Inc., Racine, Wis.

Filed Apr. 28, 1975, Ser. No. 572,099
Int. Cl.² B28B 7/06, 7/20
U.S. Cl. 249—117 **1 Claim**



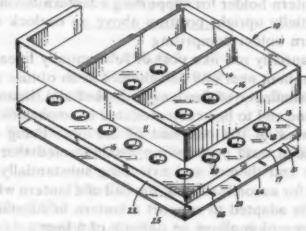
1. A hollow, one-piece distensible flexible mold for molding seamless articles, said mold having a side wall of such thickness that is is generally self-supporting and supports the weight of molding material poured therein without distortion of said mold, said side wall being outwardly expandable to permit removal of an article molded therein, said mold having internal surfaces defining a mold cavity, and said side wall including at least one integral radially inwardly extending projection extending into said mold cavity for defining an undercut in said article, said side wall including first and second openable slits for facilitating withdrawal of said projection from said undercut when said side wall expands outwardly to permit removal of said article and for providing substantially uniform outward expansion of the mold side wall, said first slit comprising a radially extending planar slit bisecting said projection and intersecting one of said internal surfaces, and said first slit extending only partly through said side wall and having a radially outer end, said second slit being an elongated slit extending transversely to said first slit, and intersecting the radial outer end of the first slit to facilitate opening of the first slit during outward expansion of the mold wall and to prevent tearing of the mold wall adjacent the first slit during expansion of the mold wall, said second slit having enlarged portions at each end.

3,998,423

COMBINATION DIE AND PALLET

Wayne L. Mullins, 10006 N. 57th St., Scottsdale, Ariz. 85253

Filed Apr. 29, 1976, Ser. No. 681,419
Int. Cl.² B28B 7/24, 7/26
U.S. Cl. 249—120 **5 Claims**



1. In a combination die and pallet of honeycomb construction;

a. a die plate of rectangular shape presenting end and side edges and formed with a plurality of depressions arranged in longitudinal rows,

b. each of said depressions being defined by a frusto conical wall and a flat bottom,

c. end flanges depending from said end edges and side flanges depending from said side edges, said flanges being integral with said die plate, having lower edges, and of a height substantially equal to the depth of said depressions,

d. a rectangular base plate of the same size and shape as said die plate and presenting end and side edges,

e. fused joints between the end and side edges of said base plate and the lower edges of said flanges,

f. spot fusions between said base plate and the bottoms of said depressions, and

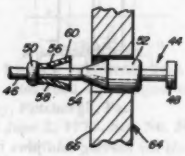
g. a plurality of longitudinal ribs upstanding from said base plate and pressed therefrom leaving grooves opening onto the lower face of said base plate, said ribs being parallel to the side edges of said plates and alternately disposed between said side edges and said longitudinal rows of depressions.

3,998,424

TIE ROD WITH EXPANDABLE LOCKING CONE

Calvin R. Johnson, 2711 Winston Ave., Las Cruces, N. Mex. 88001

Filed Aug. 6, 1975, Ser. No. 602,305
Int. Cl.² E04G 17/08
U.S. Cl. 249—190 7 Claims



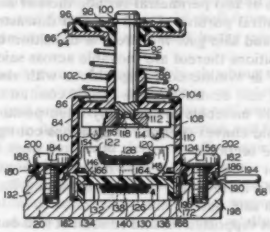
1. In combination, a concrete form wall including inner and outer sides, a tie rod, said wall having a tie rod opening formed therethrough, one end portion of said tie rod projecting centrally through said opening and having an enlarged head thereon spaced outwardly of the outer side of said wall, a wedge sleeve slidably mounted on said rod and receiving in and projecting outwardly of the inner end of said opening, an expandable abutment sleeve slidable on said rod inwardly of said wedge sleeve and a fixed enlargement on said rod inwardly of said abutment sleeve against which the opposing end of said abutment sleeve may be abutted, said abutment sleeve being of a size, before being expanded, to be snugly received through said opening, said enlargement and abutment sleeve being disposed inwardly of said inner side of said wall, said wedge sleeve including wedge portions on the end thereof adjacent said abutment sleeve wedgingly receivable into the adjacent end of said abutment sleeve for expansion of the last-mentioned end from within to a cross-sectional size larger than the cross-sectional size of the end of said opening opening through the inner side of said wall, and means operatively connected between said wall, head and wedge sleeve for drawing said one end portion of said rod outwardly through said opening relative to said wedge sleeve, and thus also drawing said enlargement toward said wedge sleeve, whereby to engage said abutment sleeve between said wedge sleeve and enlargement and effect wedging engagement of said wedge portions of said wedge sleeve into the adjacent abutment sleeve end and expansion of said adjacent abutment sleeve end to said larger cross-sectional size and thereafter substantially fully and tightly end abut the end surfaces of the expanded end of said abutment sleeve with the surface portions of the inner side of said wall extending fully about said opening to prevent inward shifting of said wall relative to said abutment sleeve and thus said rod.

3,998,425

ELECTROMAGNET ASSEMBLY FOR SAFETY VALVE

Henry C. Braucksiek, deceased, late of Buena Park, Calif. (by Myrlin J. Braucksiek, administrator), assignor to Robertshaw Controls Company, Richmond, Va.

Filed May 22, 1975, Ser. No. 579,981
Int. Cl.² F16K 31/02
U.S. Cl. 251—129 21 Claims



1. An electromagnet assembly comprising

a magnetic core,

a base having a central portion and two opposite edge portions, said magnetic core being secured to the central portion of the base,

an electrical winding wound around the magnetic core, said winding having two ends,

a housing,

first and second electrically conductive bracket means attached to the respective winding ends,

means securing the first and second conductive bracket means to the housing, and

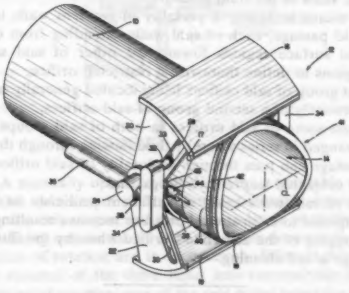
said first and second conductive bracket means each having means extending therefrom and engaging the respective edge portions of the base to secure the base to the housing.

3,998,426

CLAMSHELL-TYPE HYDRAULIC FLOW CONTROL GATE

Thomas John Isbester, Lakewood, Colo., assignor to Thomas John Isbester, Lakewood, Colo.

Filed July 10, 1975, Ser. No. 594,824
Int. Cl.² F16K 3/00
U.S. Cl. 251—147 12 Claims



1. An apparatus for controlling fluid discharge through an opening in a conduit comprising,

an outlet whereof a continuously curved perimetral surface defines said conduit opening with oppositely disposed concave sections whereto oppositely disposed convex sections are continua thereof, and wherein said convex

sections serve as guide means for reducing fan-out of the discharge fluid from said outlet,

first and second arcuately curved gate members,

means for rotatably mounting said gate members externally to said conduit, said gate members being movable upon said outlet between a fully closed position and a fully open position, said gate members in said fully closed position being contiguous to said concave and convex sections at said perimetral surface thereof and in contact at a central portion of said conduit downstream of said outlet, and said gate members in transition between said full positions thereof are movable across said continuous surface in symmetrical dispositions with respect to and beyond said central portion of said conduit opening, and said gate members in said fully open position stand beyond said convex sections at positions contiguous to said concave sections,

means for rotating said gate members between said full positions thereof for variably restricting fluid discharge through said outlet, and

seal means supported on said conduit at said outlet, said seal means forming a seal between said conduit and said gate members in said closed position.

3,998,427

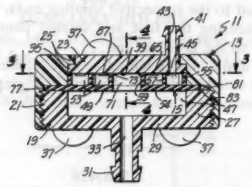
SELF-CLEANING DRIP IRRIGATION VALVE

Clarence Bentley, 9256 Stamps Ave., Downey, Calif. 90240

Filed Dec. 11, 1975, Ser. No. 639,647

Int. Cl.² F16K *5/10*

U.S. Cl. 251—208 **22 Claims**



1. A drip irrigation valve for fluid under pressure comprising:

means defining a fluid passage having a fluid passage inlet for receiving fluid under pressure and a fluid passage outlet;

said fluid passage having opposed surface regions on opposite sides of the fluid passage;

said means including a plurality of resilient walls in said fluid passage, each of said walls extending from one of said surface regions toward the other of said surface regions to define therewith a restricted orifice;

a first group of said orifices being located generally radially outwardly of a second group of said orifices;

at least some of said orifices in both of said groups being arranged in series whereby fluid flowing through the fluid passage can pass through a plurality of said orifices and be subjected to pressure drops; and

each of said walls being of sufficient resilience to flex in response to an upstream pressure increase resulting from clogging of the associated orifice whereby the fluid passage is self cleaning.

3,998,428

WELL PIPE EXTRACTOR AND INSTALLER

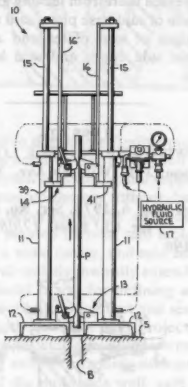
William B. Miles, P.O. Box 529, Bedford, Va. 24523

Filed Nov. 18, 1975, Ser. No. 633,158

Int. Cl.² E21B *9/00*

U.S. Cl. 254—29 R **5 Claims**

1. An apparatus for both extracting and installing a well pipe respectively from and into the ground, comprising a vertically disposed support structure, a first well pipe gripping device fixedly mounted on said structure near the lower end thereof, a second well pipe gripping device mounted on said structure for vertical movement therealong, means for moving said second device toward and away from said first device, said devices each including a pair of opposed jaws having gripping teeth thereon, said jaws being eccentrically mounted for pivotal movement toward and away from one another, spring means resiliently urging said jaws into a closing and pipe gripping position toward one another, said jaws being respectively mounted on axles having sprocket wheels thereon, a sprocket chain having free opposite ends and engaging said wheels, said spring means connecting one of said ends to a portion of each of said devices, and means actuating



said sprocket wheels for moving said jaws into an open position away from one another, said jaws having arcuately shaped free ends closely adjacent one another with gripping teeth thereon for clamping the well pipe against relative movement causing said jaws to close, whereby extraction of the well pipe is effected upon upward movement of said second device while clamping the pipe with its jaws, said jaw of said first device permitting relative upward movement of the pipe and effecting a clamping action of the pipe as said second device is moved downwardly to again grip the pipe, and whereby a lowering of the well pipe is effected under its own weight upon downward movement of said second device while clamping the pipe with its jaws, said jaws of said first device being moved away from one another by said moving means to permit lowering of the pipe below said first device.

3,998,429

STRAP TENSIONING TOOL WITH LOAD-SENSING HANDLE

Nelson Cheung, Arlington Heights, Ill., assignor to Signode Corporation, Glenview, Ill.

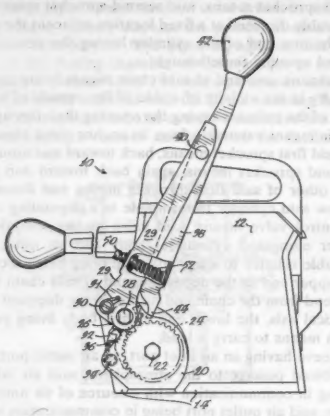
Filed Feb. 19, 1976, Ser. No. 659,415

Int. Cl.² B66F *3/00*

U.S. Cl. 254—79 **10 Claims**

1. A tensioning assembly for a strapping tool having a main frame and a feed wheel for drawing tension in a strap loop disposed about a package which comprises: a tensioning assembly support mounted on said frame; a first lever pivotally connected to said support; transmission means engageable by said first lever for rotating said feed wheel to tension the strap loop; a second lever pivotally mounted on said first lever; the second lever having a handle on one end and an engaging arm on the other end; stop means on said support adapted to be contacted by said engaging arm for stopping rotation of said second lever; and means for biasing said second lever with respect to said first lever about said pivotal mount to hold said engaging arm out of engagement with said stop means permit-

ting movement of said second lever to move said first lever for rotating said feed wheel, whereby the feed wheel can be ro-



tated to achieve a certain predetermined tension after which the second lever overcomes said biasing force and the engaging arm contacts said stop means to stop the tensioning action.

3,998,430

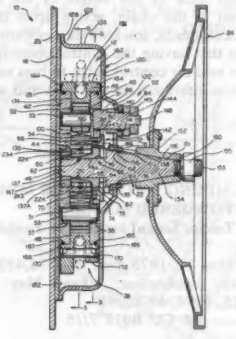
HAND BRAKE FOR RAILROAD CARS

Roger J. Weseloh, Glenwood, Ill., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 582,779

Int. Cl.² B66D 1/00

U.S. Cl. 254—149 **15 Claims**



1. A hand brake for railroad cars comprising:

a housing adapted to be mounted on a railroad car,

an operating shaft journaled in said housing for rotation about an axis extending longitudinally of said shaft,

a winding drum journaled in said housing for rotational movement about said axis and having a brake chain coupled thereto for being wound thereby,

said winding drum including a ring gear portion,

a sleeve journaled in said housing for rotational movement about said axis,

said sleeve having a cam portion thereabout that is in eccentric relation to said axis,

a pinion journaled on said sleeve cam portion and meshing with said drum ring gear portion in eccentric relation thereto for rotating said drum about said axis,

ratchet means acting between said shaft and said housing for accommodating rotation of said shaft in one direction to wind said chain on said drum and opposing rotation of said shaft in the opposite direction,

first clutch means for releasably clutching said shaft to said ratchet means on movement of said shaft in said one direction and for declutching said shaft from said ratchet means on movement of said shaft in the opposite direction,

second clutch means for releasably clutching said shaft to said sleeve for rotating said sleeve on rotation of said shaft in said one direction to actuate said pinion to rotate said drum in its chain wind up direction and for declutching said shaft from said sleeve to effect quick release of the brake under the tension in said chain,

and means for actuating said first clutch means for releasably clutching said shaft to said ratchet means, when said second clutch means is in clutching relation with said sleeve, under the tension in said chain, to maintain said shaft against rotational movement in said opposite direction thereof.

3,998,431

WINCH

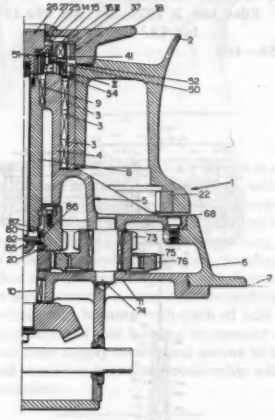
Derek James Fawcett, Rowlands Castle, England, assignor to Lewmar Marine Limited, Havant, England

Filed Apr. 29, 1975, Ser. No. 572,666

Claims priority, application United Kingdom, May 10, 1974, 20678/74

Int. Cl.² B66D 1/30

U.S. Cl. 254—150 R **8 Claims**



1. A manually operated winch having a rotatable drum, a rotatable drive input and a plurality of trains operable between the drive input and the drum, a lesser plurality of said trains being connected to drive the drum forward in a given direction of rotation and in successively different drive ratios upon reversal of the drive input into successively different directions of rotation; one of the said trains being for running back of the drum upon a further reversal of the direction of rotation of the drive input, the said trains each incorporating unidirectional drive means whereby the respective trains are automatically rendered drive-transmissible upon rotation of the drive input in the respective one direction and its opposite, a preselector operable such that only one of the trains is drive-transmissible upon rotation of the drive input in one direction, the unidirectional drive means in the run back train

comprising a worm and wheel drive, a lost motion drive being provided between the worm and the drive input, the said lost motion drive comprising means mounting the worm on a shaft constituting the drive input and permitting about 45° of free rotation between the worm and the shaft.

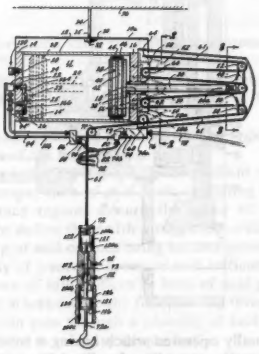
3. A manually operated winch having a rotatable drum; a rotatable drive input and a plurality of trains operable between the drive input and the drum, a lesser plurality of said trains being connected to drive the drum forward in a given direction of rotation and in successively different drive ratios upon reversal of the drive input into successively different directions of rotation, one of the said trains being for running back of the drum upon a further reversal of the direction of rotation of the drive input, the said trains incorporating unidirectional drive means whereby the respective trains are automatically rendered drive-transmissible upon rotation of the drive input in the respective one direction and its opposite, a preselector operable such that only one of the trains is drive-transmissible upon rotation of the drive input in one direction, wherein the said lesser plurality consists of three drive trains, the said plurality consisting of four drive trains, two said trains being drive-transmissible upon rotation of the drive input in the one direction and the other two of said trains being drive-transmissible upon rotation of the drive input in the direction opposite to the one direction, the preselector isolating the said trains such that only one of the two said trains and only one out of the other two of the said trains are available at any one time for respective drive-transmission according to the direction of rotation of the drive input.

3,998,432

AIR OPERATED LOAD BALANCING HOIST

Charles D. Uldricks, Newbury Park, and Alexander Enrico Kiralfy, Los Angeles, both of Calif., assignors to Charles D. Uldricks, Newbury Park, Calif.

Filed Jan. 2, 1976, Ser. No. 646,157
Int. Cl.² B66D 1/00
U.S. Cl. 254—168 **15 Claims**



1. An air pressure hoist having a load balancing capability, said hoist comprising:

an air cylinder closed at both ends, except for a centrally disposed opening in one of its ends, said cylinder having means to support it from a structure;

a piston reciprocable in said cylinder, said piston having a rod extending from one side thereof through said opening in the one end of the cylinder, to reciprocate with said piston;

an air inlet passage in one end of said cylinder;

at least two first sprocket means, said first sprocket means being rotatably disposed upon a portion of the piston rod which, when the rod is reciprocated with the piston, does not pass in and out of the cylinder;

second sprocket means, said second sprocket means being rotatably disposed at a fixed location adjacent the outside of the one end of the cylinder having the centrally disposed opening therethrough;

chain means, one end of said chain means being anchored fixedly in the vicinity of a side of the outside of said one end of the cylinder having the opening therethrough, said chain means extending from its anchor point around one of said first sprocket means, back toward and around said second sprocket means, again back toward and around the other of said first sprocket means and downwardly below said cylinder to terminate in a depending end;

air control valve means, said valve means comprising an inner elongated cylindrical body and an outer sleeve slidable relative to said body, said body being secured at its upper end to the depending end of said chain to itself depend from the chain and further being disposed along a vertical axis, the lower end of said body being provided with means to carry a load;

said sleeve having an air inlet port, an air outlet port and an air bleed passage to the atmosphere, said air inlet port being in communication with a source of air under pressure; said air outlet port being in communication with the air inlet passage in said one end of said cylinder;

said body having air passage means whereby, when said sleeve is shifted upwardly relative to said body to a first position, said air inlet port in the sleeve is placed in communication with its air outlet port, thereby delivering air to the cylinder to drive its piston toward that end of the cylinder with the centrally disposed opening, and through the movement of the piston rod and its carrying the said first sprocket means and chain means away from the last said cylinder end, raising the dependent end of the chain means, the air control valve means and any load carried by the means to carry such load; and

when said sleeve is shifted downwardly relative to said body to a second position, said air outlet port is placed in communication with said bleed passage, thereby to remove air pressure from the cylinder so that the piston may be forced back by the weight of the load on the dependent end of the chain, acting upon the first and second sprocket means, towards the opposite end of the cylinder from that having the central opening; and

spring means in said air control valve to bias said sleeve to a third position intermediate said first and second positions.

3,998,433

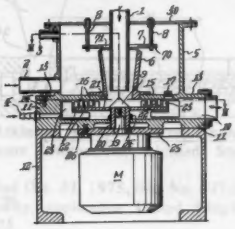
CONTINUOUS MIXING MACHINE FOR MOISTENING POWDERED MATERIAL

Hiroyuki Iwako, Tokyo, Japan, assignor to Funken Co., Ltd., Tokyo, Japan

Filed May 12, 1975, Ser. No. 576,459
Claims priority, application Japan, May 10, 1974, 49-51856; July 25, 1974, 49-85398
Int. Cl.² B01F 7/16
U.S. Cl. 259—8 **8 Claims**

1. A continuous mixing machine for adding a predetermined proportion of liquid to powdered material including: a liquid reservoir tank (5) provided with a liquid inlet pipe (2) to be continuously fed with liquid therethrough, a tubular overflow structure (6) of inverted frusto-conical shape fixedly arranged in said liquid reservoir tank centrally thereof so as to enable the liquid fed to said liquid reservoir tank (5) to flow over the top circumferential edge of said tubular overflow structure (6) and down the inner wall surface thereof, a vertically extending powder feed pipe (1) adapted to receive powder from a conveyor tube or the like and opening at the bottom to the interior space of said tubular overflow structure, means defining a mixing chamber below and adjacent the bottom openings of the powder feed pipe and the overflow

structure, a pointed circular cone (9) arranged in the mixing chamber vertically opposite to the bottom opening of said powder feed pipe (1) and adapted to be driven to rotate about its own axis to radially disperse the powdered material delivered from said powder feed pipe, an agitator disc (21) arranged in the mixing chamber of the machine to rotate with said pointed circular cone (9) and operable to mix the dispersed powdered material with the liquid entering the mixing chamber through said tubular overflow structure (6) along the inner wall surface thereof and a device for facilitating the



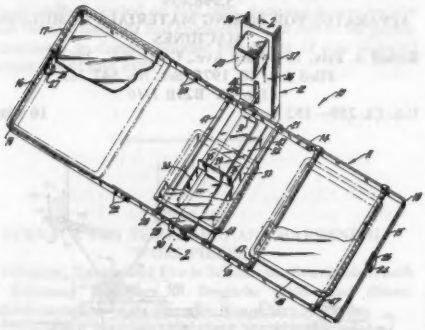
overflow of liquid into said tubular overflow structure (6) in the form of thin film descending along the inner wall surface thereof, said device including an annular board (7) having a circular opening (71) of a diameter substantially equal to the inner diameter of the top end of said tubular overflow structure (6) and arranged around and closely adjacent to the top thereof for free vertical movement with the level of liquid in said reservoir tank (5) to reduce disturbance of the surface of the liquid adjacent to the top of said tubular overflow structure (6), thereby aiding formation of the thin liquid film down the inner wall surface of said tubular overflow structure.

3,998,434

PHOTOGRAPHIC TRAY ROCKER

Edwin S. Gaynor, 688 Hulls Farm Road, Southport, Conn. 06490

Filed Feb. 21, 1975, Ser. No. 551,706
Int. Cl.² B01F *13/00*; G03D *3/04*
U.S. Cl. 259—73 **12 Claims**



1. Apparatus for rocking photographic developing trays comprising:

an open rectangular frame, having two parallel sides joined by two ends perpendicular thereto, the internal dimensions of the frame being adapted to accomodate a predetermined plurality of rectangular photographic developing trays of preselected size nested within the frame;

means for supporting the frame above a flat surface near the midpoint of each end of the frame for rocking movement;

a transverse member joining the two sides of the frame and having a pivot point at the center of the member;

a separate base member adapted to rest on the flat surface and extend underneath the transverse member, the base member having a locating pivot for engaging the pivot point on the transverse member and locating the frame with respect to the base member;

an electric motor drive unit mounted on the base member and having an eccentric output member of predetermined eccentricity rotatable at a predetermined speed; and

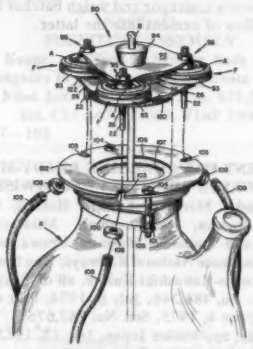
means for coupling the eccentric output member to the frame for rocking the frame on the support means at predetermined amplitude and frequency.

3,998,435

OSCILLATING STIRRERS

Norman Adrian de Bruyne, 3700 Brunswick Pike, Princeton, N.J. 08540

Continuation-in-part of Ser. No. 545,140, Jan. 29, 1975, abandoned. This application Aug. 22, 1975, Ser. No. 606,770
Int. Cl.² B01F *13/00*
U.S. Cl. 259—114 **13 Claims**



1. An oscillatory stirring apparatus for liquids in a container comprising a stirring assembly attachable to said container and means to supply at least two cyclically alternating flows of air under positive pressure and negative pressure to said stirring assembly, said stirring assembly comprising a housing containing at least two pressure-activated chambers spacedly arranged within said housing, a stirring rod dependingly supported within said housing, means interconnecting a portion of said rod within said housing with each of said chambers, means on the exterior of said housing to connect said chambers to said air flow supply means and means to secure said housing to said container in sealing relationship with an opening in said container.

3,998,436

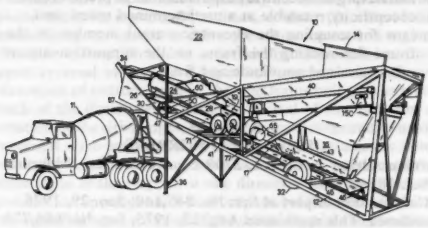
MOBILE CONCRETE BATCH PLANT

Albert J. Allen, Clintonville, Wis.; Arthur D. Davis, Champaign, Ill.; James J. Fasimpaur, Englewood, Ohio; Fred A. Goglia, Urbana, and Cecil A. Pike, Mahomet, both of Ill., assignors to Koehring Company, Milwaukee, Wis.

Filed Feb. 28, 1974, Ser. No. 446,671
Int. Cl.² B01C *5/02*
U.S. Cl. 259—154 **10 Claims**

1. In a concrete batch plant for supplying weighed batches of cement and aggregate to transit mixers: a discharge hood defining a discharge opening positioned to gravity feed a transit mixer; an aggregate storage bin; a cement storage bin; a weigh bin for receiving and weighing a batch of aggregate from said aggregate storage bin; a conveyor for receiving a

weighed batch of aggregate from said weigh bin and for transporting the weighed batch of aggregate to said discharge hood for discharge through said discharge opening: a combined screw conveyor and weigh batcher having an inlet and outlet and adapted for receiving and weighing a batch of cement from said cement storage bin and for transporting a weighed



batch of cement to said discharge hood for discharge through said discharge opening of said discharge hood concurrently with the discharge of said aggregate; and a multistage controllable valve between said cement storage bin and said inlet of said combined screw conveyor and weigh batcher for regulating the rate of flow of cement into the latter.

3,998,437

EQUIPMENT FOR CHARGING READY-MIXED CONCRETE ADDITIVES BATCHWISE

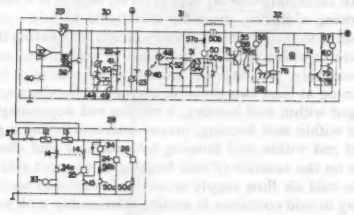
Toshiyuki Kitsuda, Morioka; Kenichi Hattori, Musashino; Hiromi Nakagawa, Wakayama; Mitsuru Wakao, Sagamihara, and Tsunehisa Matsuda, Urawa, all of Japan, assignors to Japanese National Railways; Kao Soap Co., Ltd. and Kayabakogyo-Kabushiki-Kaisha, all of Tokyo, Japan

Division of Ser. No. 486,348, July 8, 1974. This application June 4, 1975, Ser. No. 583,675

Claims priority, application Japan, July 12, 1973, 48-77938

Int. Cl.² B28C *7/04*; **B60P** *3/16*

U.S. Cl. 259—154 **7 Claims**



1. An arrangement for preventing deterioration in the quality of ready-mixed concrete during transportation thereof over long distances in a mobile power mixer, by batchwise charging of additives into the body of ready-mixed concrete so as to adjust the slump value thereof, comprising first means for detecting the slump value of the concrete as a function of changes which occur in the power mixing torque during the transportation of the concrete, and for generating an electrical signal proportional to the thus detected value; second means for comparing the detected value with a preset reference value, and for generating a trigger signal when the values coincide; third means for discharging slump-value adjusting additives into the concrete in response to the generation of such trigger signal; fourth means for timing the operation of said third means; and fifth means for resetting said arrangement upon the elapse of a predetermined interval after generation of said trigger signal.

3,998,438

EXTRUDER PLASTICIZING AND MIXING SCREW

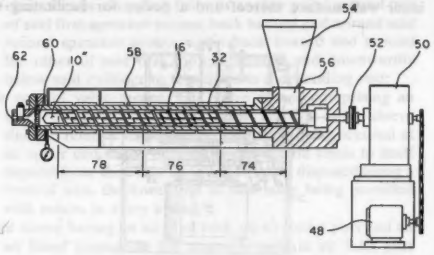
Nickolas N. Sokolow, Roscoe, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Sept. 17, 1973, Ser. No. 397,674

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² A21C *1/06*; **B29B** *1/06*

U.S. Cl. 259—191 **8 Claims**



1. A screw for use in the bore of a plastic extruder, said screw comprising:

a substantially straight, cylindrically shaped center shaft member of uniform diameter and cross-section throughout the length thereof having a longitudinal axis of rotation and a peripheral surface;

a raised screw thread superimposed on the shaft member and extending continuously axially therealong;

a plurality of land surface areas on the shaft member surface, non-coincident therewith, along the pitch length of the screw thread for at least a portion of the screw length;

the land surface areas are arranged in a checkerboard pattern in the direction of a path following and adjacent the screw thread along the shaft member surface, wherein some of the land surface areas form the bottoms of pockets recessed in the shaft member surface, and some of the land surface areas form the upper surfaces of lobes extending above the shaft member surface.

3,998,439

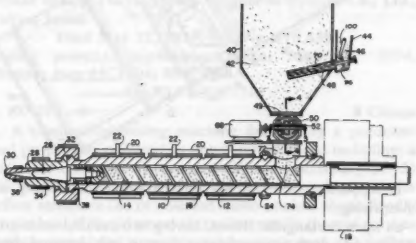
APPARATUS FOR MIXING MATERIALS IN MOLDING MACHINES

Rudolf A. Feix, 131 Clark Ave., Greer, S.C. 29651

Filed Jan. 20, 1975, Ser. No. 542,363

Int. Cl.² B29B *1/10*

U.S. Cl. 259—192 **10 Claims**



1. For use in a molding machine and the like having a main feed hopper containing a primary molding material, an auxiliary hopper for feeding an additive material into said main hopper, a mixing chamber for mixing said primary material and said additive together having an inlet opening connected to said main hopper and an outlet opening connected to a tubular conveyor chamber for conveying mixed material away

therefrom, said mixing chamber including a transverse rotatable shaft extending across said mixing chamber carried therein, a plurality of ring elements having intersecting planes carried by said shaft closely adjacent an interior surface of said mixing chamber for removing and cleaning said materials therefrom, each ring element being symmetric about said shaft, a plurality of outwardly extending mixing arms carried by said shaft for mixing the materials together within said ring elements.

3,998,440

FURNACE VESSELS

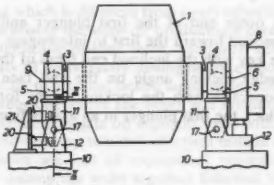
Donald Alan Atkinson, Stockton-on-Tees, England, assignor to Davy Ashmore International Limited, Stockton-on-Tees, England

Filed Oct. 31, 1975, Ser. No. 627,680

Claims priority, application United Kingdom, June 13, 1975, 25319/75

Int. Cl.² C21C *5/50*

U.S. Cl. 266—245 **5 Claims**



1. A furnace vessel having a pair of trunnion pins projecting from opposite sides thereof, a pair of pedestal structures each carrying a bearing, said trunnion pins rotatably mounted in the bearings, a pair of spaced vertical supports including a pair of pins defining parallel axes spaced from and perpendicular to the axes of rotation of the trunnion pins, said pedestal structures pivotally mounted on said pins, damping means on one of said vertical supports and engageable with one of the pedestal structures to damp pivotable movement of said pedestal structure about said axes.

3,998,441

FURNACE FOR TEMPERING AND HARDENING WORKPIECES

Rolf Schuster, Hanau, and Erwin Schumann, Bruchkobel, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

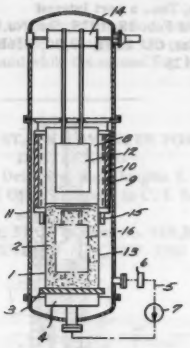
Filed May 24, 1976, Ser. No. 689,516

Claims priority, application Germany, May 30, 1975, 2523952

Int. Cl.² C21D *1/00*

U.S. Cl. 266—250 **3 Claims**

1. A furnace suitable for annealing and quenching workpieces comprising an annealing chamber and a quenching chamber disposed vertically below said annealing chamber, said quenching chamber containing a fluidizable bed of solid particles which, when in stationary position, serves as thermal insulation for the bottom of said furnace, means for introducing fluidizing gas into the quenching chamber during the quenching of the workpiece and for preventing the introduction of said gas during annealing of a workpiece and lateral heat insulation on the annealing chamber extending below the



upper surface of the fluidized bed when said bed is not in the fluidized condition.

3,998,442

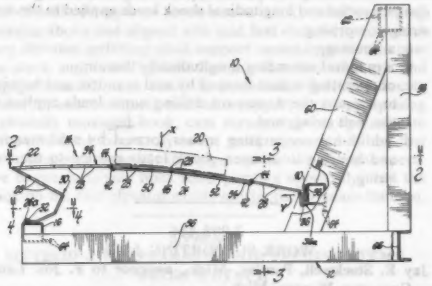
FURNITURE ASSEMBLY

Thomas H. Keane, and Fred B. Schultz, both of Morristown, Tenn., assignors to Lear Siegler, Inc., Santa Monica, Calif.

Filed Jan. 23, 1976, Ser. No. 651,991

Int. Cl.² A47C *27/08;* **F16F** *3/00*

U.S. Cl. 267—105 **8 Claims**



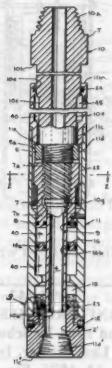
1. A furniture spring assembly comprising: a primary spring for providing support between spaced front and rear frame members of a furniture seat cushion, said primary spring being of the formed wire type including transversely extending torsion bars and connecting portions connected with the torsion bars at generally right-angle bends, the primary spring including front and rear ends adapted for mounting on the front and rear frame members and a support section extending between the front and rear ends to provide support for seat cushion padding, and the front end of the primary spring including a fishmouth section that spaces the support section above the front frame member; and an auxiliary spring for the support section of the primary spring, the auxiliary spring including transverse ends secured to torsion bars of the support section which are spaced from each other with a plurality of torsion bars of the support section therebetween, the auxiliary spring including an intermediate portion extending between the transverse ends thereof immediately below the support section of the primary spring so as to provide support to the support section torsion bars located between the transverse ends, and the intermediate portion of the auxiliary spring including a transverse torsion bar located immediately below the support section of the primary spring to provide support thereto and a location where bending takes place and also including front and rear legs that connect the transverse ends with the transverse torsion bar in a Z-shaped fashion.

3,998,443

MULTIDIRECTIONAL SHOCK ABSORBING DEVICE

Derrel D. Webb, Houston, Tex., assignor to Edwin A. Anderson, Houston, Tex., a part interest

Filed Feb. 18, 1975, Ser. No. 550,358
Int. Cl.² E21B 17/00; F16D 3/12
U.S. Cl. 267—125 18 Claims



1. In a device for connection in a well string to support the downward drilling work loads applied to the well string and to dampen radial and longitudinal shock loads applied to the well string comprising:

a. a housing;

b. a mandrel extending longitudinally therein;

c. cooperating means formed by said mandrel and housing to support the downward drilling work loads applied to the well string; and

d. additional cooperating means formed by said mandrel and housing to dampen shock loads applied to the well string.

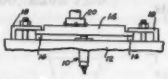
3,998,444

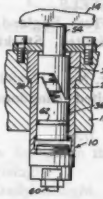
WORK SUPPORTING JACK

Jay E. Stockwell, Pontiac, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed Jan. 22, 1976, Ser. No. 651,524
Int. Cl.² B23Q 3/10
U.S. Cl. 269—20 15 Claims

1. A work-supporting jack comprising a support member having a bore therein, first and second opposed plungers axially slideable in said bore toward and away from each other, the confronting ends of said plungers comprising a pair of confronting faces which are inclined to the axis of the bore at an acute angle and which are spaced apart transversely of said bore, a key disposed in the space between said confronting faces, said key being fixed axially of the bore and having opposed faces adapted to be abutted by said inclined end faces of the plungers, said key being movable transversely of the bore in response to abutment of either of said opposed faces with said end faces of the plungers, the first plunger having its other end projecting axially outward of said bore for supporting engagement with a workpiece, means biasing said first plunger axially outwardly of said bore, said end face of said first plunger being inclined to the axis of the bore at a wedge locking angle relative to the key so that movement of the key into abutting engagement with the inclined end face of the first plunger will not produce axial movement of the first plunger outwardly of the bore, means for moving the second plunger in a direction toward the first so that the inclined end face of the second plunger bodily moves the key transversely of the bore into abutting relation with the adjacent inclined end face of the first plunger, and means for locking the second plunger against axial movement in a direction away from the first plunger when said opposed faces of the key are in abutting engagement with the inclined end faces of both plungers, whereby, when the first plunger is moved axially inwardly of said bore against said biasing means by a workpiece positioned





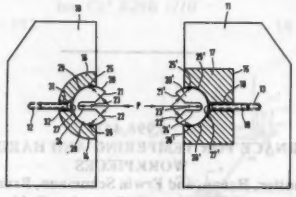
against the outer end of the first plunger and the second plunger is moved toward the first to interengage the opposed faces of the key with the inclined end faces of the two plungers, the wedge locking angle on the end face of the first plunger cooperates with the locking means for the second plunger to lock the first plunger in an axially fixed position in said bore.

3,998,445

CLAMPING FIXTURE

Richard Goltz, Grundweg 2, D-7123 Sachsenheim 2, Germany

Filed Nov. 28, 1975, Ser. No. 635,855
Claims priority, application Germany, Dec. 21, 1974, 2460833
Int. Cl.² B25B 1/24
U.S. Cl. 269—258 9 Claims



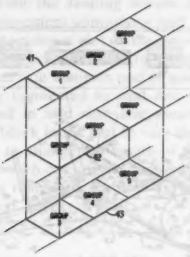
1. A fixture for clamping rectangular workpieces and/or tools comprising a pair of oppositely directed supports movable toward and away from each other, a cylindrical chuck jaw located in each support and freely rotatable about a longitudinal axis of rotation with respect to said support each of said chuck jaws having a cut-out sector extending along its length defined by a pair of surfaces set at right angles to each other to intersecting in a common edge coaxial with the axis of rotation and a radially directed slot extending inwardly through said jaw from the intersecting clamping surfaces terminating short of the peripheral wall of said jaw opposite said cut-out sector.

3,998,446

METHOD OF MAKING BOOKLETS OF TOMBOLA OR BINGO TICKETS

Carl Richard Dent, 5 Quoite Meadow, Stonham Aspal, Stowmarket, Suffolk, England

Filed Sept. 22, 1975, Ser. No. 615,576
Int. Cl.² B41F *13/64*
U.S. Cl. 270—18 17 Claims



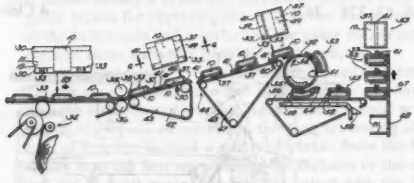
17. A method of producing a set of ticket booklets wherein each booklet has a series of coded tickets arranged in a predetermined sequential fashion which is the same for every booklet in the set but wherein any one ticket in any one booklet bears a coding which is different from every other ticket in the entire set comprising the steps of: producing a predetermined number of identically printed webs, each web being printed with a plurality of individually distinguishable coded indicia, each conforming to a coded ticket; superposing said plurality of identical webs one above the other and longitudinally displacing the identical indicia on adjacent webs with respect to each other whereby any selected identical indicia of any two superposed webs are out of superposed registry with one another; and uniting the webs together followed by severing the united webs in predetermined fashion into the desired set of ticket booklets.

3,998,447

METHOD AND APPARATUS FOR FOLDING FLAPS OF A SANITARY PAD

Curt G. Joa, P.O. Box 1121, Boynton Beach, Fla. 33435

Filed Sept. 4, 1975, Ser. No. 610,199
Int. Cl.² B65H *45/00*
U.S. Cl. 270—61 R 20 Claims



1. The method of folding against a relatively thick pad first and second relatively thin flaps respectively at leading and trailing ends of said pad and comprising the steps of:

advancing the pad in one direction with said first flap disposed at the leading end of the pad as it moves in said one direction and the second flap disposed at the trailing end of the pad as it moves in said one direction,

folding said first flap back against the pad while advancing the pad in said one direction and while said first flap is at the leading end of the pad,

turning the pad end-for-end before the second flap is folded against the pad, thus to dispose the second flap in its unfolded condition at the end of the pad which is now its leading end with respect to said one direction,

holding the first flap against the pad while the pad is being turned,

advancing the pad in said one direction, and

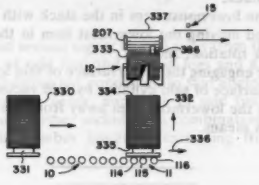
folding said second flap back against the pad in the course of said advance and while the second flap is at the leading end of the pad.

3,998,448

CONTINUOUS STACK ADVANCER FOR BLANK DESTACKING

Archibald C. Gray, Delaware, and Douglas I. Van Aernum, Columbus, both of Ohio, assignors to C. I. Industries, Inc., Delaware, Ohio

Filed Oct. 31, 1974, Ser. No. 519,399
Int. Cl.² B65H *1/30, 3/08, 3/60*
U.S. Cl. 271—12 22 Claims



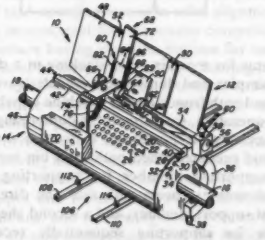
3. A blank feeder comprising an infeed conveyor for horizontally transferring a stack of blanks, a first elevator at the end of said conveyor to receive such stack, and a secondary elevator above and aligned with said first elevator, said secondary elevator including stack support means operative to pass the stack supported by said first elevator therethrough and engage beneath such stack to permit the first elevator to return for another stack, said stack support means comprising a pivotally mounted hook, cam means thereon operative to pivot said hook outwardly as the stack supported by the first elevator moves upwardly thereagainst, and latch means operative to preclude said hook from pivoting outwardly until the stack on the first elevator exerts substantial pressure thereon.

3,998,449

METHOD AND APPARATUS FOR FEEDING ITEMS FROM A STACK

Helmut O. Hornung, Altoona, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncansville, Pa.

Filed June 30, 1975, Ser. No. 592,064
Int. Cl.² B65H *3/10, 5/12*
U.S. Cl. 271—112 12 Claims



1. Apparatus for feeding items from a stack comprising,

a stack receiver arranged to support a stack of items,

a cylinder rotatably mounted adjacent to and beneath said stack receiver,

a protuberance extending along the surface of said cylinder,

vacuum means on the surface of said cylinder positioned adjacent to said protuberance,

a wiper device positioned adjacent to said cylinder surface and said stack receiver,

said protuberance arranged upon rotation of said cylinder to contact the lowermost item in a stack positioned on said stack receiver and move at least the leading edge portion of said lowermost item beyond said wiper device, and

valve means to actuate said vacuum means on said cylinder when said vacuum means rotates past said wiper device so that the undersurface of the lowermost item is engaged to the cylinder surface.

11. A method for feeding items from a stack comprising,

positioning a stack of items in a stack receiver above a rotatable cylinder having a protuberance projecting beyond the surface of the cylinder and vacuum means on the surface of the cylinder,

rotating the cylinder in a direction toward the leading edge of the stack,

striking the lowermost item in the stack with the protuberance and moving the lowermost item in the direction of cylinder rotation, and

thereafter engaging the undersurface of said lowermost item to the surface of said cylinder by said vacuum means and moving the lowermost item away from the stack by said vacuum means.

3,998,450

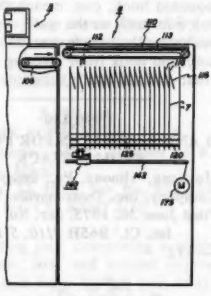
SORTING APPARATUS

Anthony Howard, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 339,675, March 9, 1973, abandoned. This application Oct. 7, 1975, Ser. No. 620,431

Int. Cl.² B65H *29/60, 31/24*

U.S. Cl. 271—173 **6 Claims**



6. Apparatus for receiving and stacking in a desired order, a series of simplex and duplex copy sheets traveling along a predetermined path from a copier machine capable of simplex and duplex operation, said apparatus comprising:

a sheet receiving bin positioned to receive sheets traveling along said predetermined path, said bin including a first sheet supporting member for supporting suquentially received simplex sheets with side one directed towards said first support member, and a second sheet supporting member for supporting sequentially received duplex sheets with side two directed towards said first supporting member, deflector means to direct each sheet from said path into the interior of said bin toward either said first or second sheet supporting member, said means being actuatable to direct each sheet towards the particular sheet supporting member dependent upon whether simplex or duplex operation is desired.

3,998,451

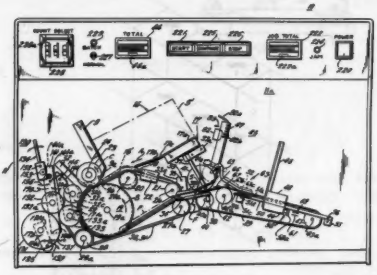
TICKET COUNTER AND ENDORSER

George P. McInerny, Andalusia, Pa., assignor to Brandt-Pra, Inc., Cornwells Heights, Pa.

Division of Ser. No. 465,700, April 30, 1974, Pat. No. 3,944,210. This application Nov. 17, 1975, Ser. No. 632,318

Int. Cl.² B65H *31/02, 31/20*

U.S. Cl. 271—212 **8 Claims**



1. A bottom-feed stacker assembly for stacking documents delivered thereto along a first path comprising a hopper back plate;

elongated conveyor means having a conveyor surface moving from a stacker input end towards said back plate;

means for delivering documents toward said conveyor means to be moved toward said back plate;

a movable stacker arm positioned above said conveyor means for resting upon the stack documents collected upon said conveyor means;

said conveyor means being offset at an angle relative to said first path to cause the leading edge of entering documents to pass beneath the previously fed document;

means responsive to movement of said stacker arm as said stack increases in height to reduce the force exerted upon the stack by said stacker arm.

3,998,452

DEVICE FOR REGULATING A FEEDING STROKE

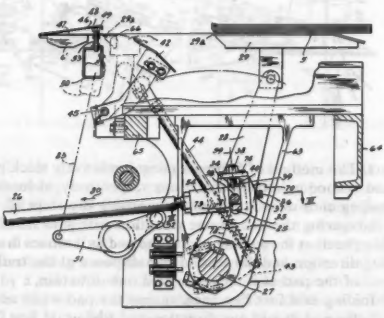
Charles Grieshaber, Ecublens, Switzerland, assignor to J. Bobst & Fils S.A., Prilly, Switzerland

Filed May 15, 1975, Ser. No. 577,940

Claims priority, application Switzerland, May 22, 1974, 7092/74

Int. Cl.² B65H *3/08, 5/10*

U.S. Cl. 271—267 **4 Claims**



1. In a feeding device having a feeding unit having a feeding stroke between a first and second position to feed a sheet of material into a sheet processing device, said feeding device

including means for reciprocating the feeding unit between said positions during a feeding stroke, said means including a shaft mounted for oscillation, a lever mounted on said shaft and connected to the feeding unit, a rocker arm mounted on said shaft, a rod having one end attached by an adjustable pivotable connection to said rocker arm and means for reciprocating the rod to move the rocker arm in an arc between a pair of positions to oscillate the shaft and move said lever in an arc to reciprocate the feeding means through the feeding stroke, the improvement comprising said adjustable pivotable connection comprising a slot being provided in said rocker arm and extending perpendicular to a longitudinal axis of said rod as the rocker arm assumes one of said pair of positions, a block pivotably connected to said one end of the rod and slidably received in said slot, and means for adjusting the position of the block in the slot to vary the effective length of the rocker arm to change the length of the feeding stroke of the feeding unit with one of said first and second positions of the feeding unit remaining fixed as the length of the feeding stroke is changed.

3,998,453

SHEET CONVEYOR APPARATUS

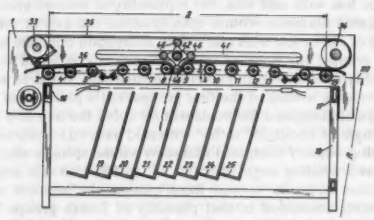
Wilfried Dorer, Rebberg, Germany, assignor to Firma Mathias Baurele GmbH, St. Georgen, Black Forest, Germany

Filed May 19, 1975, Ser. No. 578,499

Claims priority, application Germany, Jan. 15, 1975, 2501378

Int. Cl.² B65H *29/16*

U.S. Cl. 271—272 **11 Claims**



1. A sheet conveyor apparatus for transporting sheets in a longitudinal direction along a transport path, comprising:

a plurality of rotatable guide means positioned in axially spaced parallel relation and extending transverse to said direction of sheet transport;

belt means having a lower run thereof associated with the guide means for capturing sheets between the lower run of the belt means and a surface of the guide means defining said sheet transport path therebetween; and

a first set of said guide means having their axes of rotation located on a common arc and their surfaces in contact with the lower run of the belt means, and a second set of said guide means intermediate the first set having their axes of rotation located a greater distance from the belt means than the first set whereby the surfaces of the second set of guide means are out of contact with the belt means.

3,998,454

FORCE RECEIVING EXERCISING MEMBER

Arthur A. Jones, Lake Helen, Fla. 32744

Division of Ser. No. 360,590, May 15, 1973, Pat. No. 3,858,873, which is a continuation of Ser. No. 172,478, Aug. 17, 1971, abandoned. This application Sept. 17, 1974, Ser. No. 506,795

Int. Cl.² A63B *21/00*

U.S. Cl. 272—117 **3 Claims**

1. A force applying member for use in an exercising machine comprising a pair of generally L-shaped levers each of which has a first leg extending generally parallel to a first leg of the other L-shaped lever and a second leg extending generally parallel to a second leg of the other L-shaped lever, force receiving means for receiving force applied in an exercise on each of said first legs adjacent the intersection of each of said first and second legs of each L-shaped lever, an angled portion

on each of said second legs at an end away from the respective intersections of said first and second legs and a transversely extending stabilizing bar connected to said angled portions to define a clearance space, and each of said first legs of the L-shaped levers further including in combination therewith a rotatable hub member integrally extending from one end thereof.

3,998,455

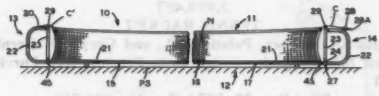
FREE STANDING PORTABLE AND KNOCKDOWN TENNIS NET SUPPORTING SYSTEM

Robert E. Billmeyer, Wilton, Conn., assignor to National Associates (U.S.A.) Inc., Wilton, Conn.

Filed Feb. 18, 1975, Ser. No. 550,821

Int. Cl.² A63B *61/00*

U.S. Cl. 273—29 BD **5 Claims**



1. A portable and knockdown tennis net support system for removably mounting on a conventional lawn tennis playing surface, said system comprising an elongated substantially horizontal stretcher base means, net anchoring means attached to opposite ends of said stretcher means and in upstanding relationship therewith each of said anchoring means including an elongated extension stretcher portion, means for connecting each of said extension stretcher portions to opposite ends of said stretcher means in axial alignment therewith; and footing means, said footing means comprising elongated footing members having portions thereon for contacting said playing surface, means for mounting a footing member intermediate the ends of each of said extension stretcher portions and in transverse relation thereto, means for securing upper and lower corner portions of a lawn tennis net at one end thereof to corresponding upper and lower portions of one of said net anchoring means, means for securing upper and lower corner portions of said net at the other end thereof to corresponding upper and lower portions of the other of said net anchoring means, and tensioning means on an upper portion of the other of said anchoring means for engaging the upper corner portion of said net at the other end thereof for tensioning said net as a whole; each of said net anchoring means comprising a tubular member bent into a substantially J-shaped configuration, the long leg of said J-shape being at a lower elevation than the short leg of said J-shape, said long leg being attached to one end of said stretcher means and being said extension, stretcher portion thereof, said short and long

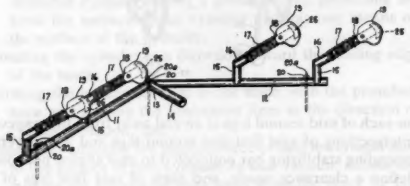
legs of said J-shape being coplanar in a substantially vertical plane; a vertical strut member, said strut member having its lower end attached intermediate the ends of said long leg, and said short leg having its free end attached adjacent the upper end of said vertical strut member, said tensioning means being mounted on said upper leg of one of said anchoring means.

3,998,456

FOOTBALL TRAINING DEVICE

James T. Sherman, 2217 W. 19th St., Yuma, Ariz. 85364

Filed May 27, 1975, Ser. No. 580,563
Int. Cl.² A63B 67/00
U.S. Cl. 273—55 A 7 Claims



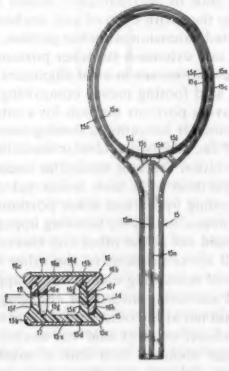
1. A football training device for training defensive football players in the blocking rip-up movement comprising V-shaped structure ground standard means, a plurality of upright structural means attached to each side of said V-shaped ground standard means in defined spaced apart relationship, spring means connecting to said upright structural means distal said ground standard means, and helmet means connecting said spring means distal said upright structural means whereby a defensive football player centrally located in said V-shaped structure may block aside said helmet means on one side and continue on to block said other helmet means behind him in one continuous motion.

3,998,457

TENNIS RACKET

Douglas E. Dempsey, Palatine, Ill., and Gerald F. Herndon, West Minster, Colo., assignors to Pepsico, Inc., Purchase, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,755
Int. Cl.² A63B 49/10
U.S. Cl. 273—73 C 13 Claims



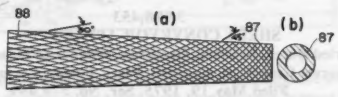
13. A tennis racket frame comprising a pair of identical channel-shaped members each having spaced walls and grooves therealong, said channel-shaped members being inter-engaged in inverted relationship with each other so that walls of one member are received in grooves of the other, said walls having spaced elongated slots therein in spaced relation, the slots in said walls cooperating when said channel members are in said inverted relationship to provide spaced substantially round stringing holes by the overlapping of said elongated slots, said holes being on centerlines extending transversely to the planes of the walls.

3,998,458

GOLF CLUB SHAFT

Mitsuhiro Inoue, Shimodate; Yo Maeda, Yuki; Kohei Tsumura, and Syozo Ohashi, both of Shimodate, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed July 10, 1975, Ser. No. 594,889
Claims priority, application Japan, July 12, 1974, 49-79192
Int. Cl.² A63B 53/10
U.S. Cl. 273—80 R 4 Claims



1. A hollow golf club shaft with its diameter reducing from one end to the other end and consisting essentially of (a) a plurality of first groups of elongated filaments wound spirally about the longitudinal axis of the shaft at a winding angle of 10° or less with said axis, (b) a plurality of second groups of elongated filaments wound spirally about the axis at winding angle of 10° or less with said axis in a direction opposite to said first groups, the amount of the filaments contained in said plurality of second groups being substantially equal in weight and volume to that of the first groups, (c) a plurality of third groups of elongated filaments wound about the axis at a winding angle of about 25° to 65° with said axis, (d) a plurality of fourth groups of elongated filaments wound spirally about the axis at a winding angle of about 25° to 65° with said axis in a direction opposite to said third groups, the amount of the filaments contained in said plurality of fourth groups being substantially equal in weight and volume to that of the third groups, the first, second, third and fourth groups of filaments being laid upon one another, the winding angles of the third and fourth groups of the filaments being larger at a portion of the shaft having a reduced diameter than at a portion of the shaft having an increased diameter and continuously varying inversely with the shaft diameter, and (e) a heat-hardened synthetic resinous material binding the filaments and filling the interstices therebetween to form a unitary solid mass.

3,998,459

ELECTRICAL SHOCKING DEVICE

Gary A. Henderson, and Douglas K. Dubuque, both of Lynnwood, Wash., assignors to American Home Products Corporation, New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,590
Int. Cl.² F41B 15/04
U.S. Cl. 273—84 6 Claims

1. A manipulable electrical shocking device comprising in combination:

a. a housing;

b. a pair of electrically conductive probes for delivering a series of short duration, high voltage, low current electrical shocks to objects in contact with said probes;

c. a hollow tubular member positioned within said housing, said pair of probes being mounted in said tubular member and extending beyond said tubular member and said housing;

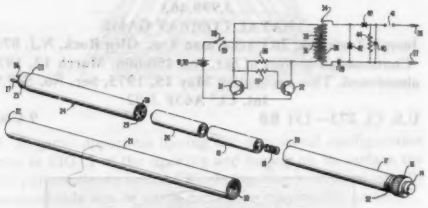
d. a low direct voltage power source positioned within said housing; and

e. an electronic circuit means for converting low direct voltage to high direct voltage coupled intermittently to said pair of probes and said power source, said circuit means including:

i. oscillator means positioned within said tubular member for producing an alternating current output;

ii. a step-up transformer positioned within said tubular member and having its primary winding coupled to receive the alternating current output from said oscillator means for producing a high alternating voltage across its secondary winding;

iii. rectifying means positioned within said tubular member for producing a high direct voltage output to the probes, said rectifying means including a rectifier and charge storage means coupled to said secondary winding for producing a direct voltage across said charge storage means, one end of said charge storage means being coupled to one of said probes;



iv. spark gap means positioned within said tubular member for producing repeated pulses of high voltage shocking current, said spark gap means being connected in series between said charge storage means and the other of said probes, thereby providing a conductive path when said direct voltage across said charge storage means is high enough to assure effective shock to said objects in contact with said probes and automatically interrupting the current flow when the charge of said charge storage means is depleted; and

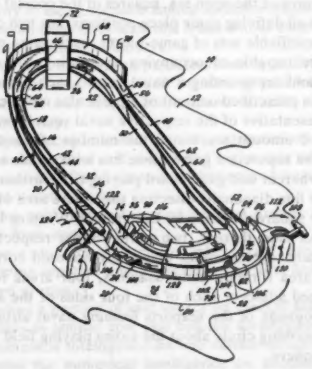
v. switch means positioned within the housing for selectively energizing said oscillator means from said low direct voltage source.

3,998,460

VEHICLE RACING GAME APPARATUS

Robert Ford Dyer, Rancho Palos Verdes, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Feb. 3, 1976, Ser. No. 655,023
Int. Cl.² A63F 9/14
U.S. Cl. 273—86 D **6 Claims**



1. An improved toy vehicle propulsion system for providing propulsion impulses by means of an external vehicle engaging member to a toy vehicle, said system comprising:

a rotatably mounted driving hub;

a handle attached to said driving hub for imparting rotational impulses to said driving hub;

a circumferential drum surface provided as part of said driving hub and co-axial therewith;

a drive tape having one end thereof attached to and a portion generally disposed about said drum surface;

a vertical shaft extending from a generally horizontal surface; and

a propulsion arm rotatably mounted about said vertical shaft, said arm comprising:

an inner hub portion which together with said horizontal surface defines a fulcrum immediately adjacent the intersection of said vertical shaft and said horizontal surface, said arm being free to rock in a vertical plane about said fulcrum;

an outer hub portion defining a generally vertical circumferential drum surface vertically displaced from said fulcrum, the other end of said drive tape being fastened to said outer hub portion and a portion of said tape being generally disposed about said vertical drum surface; and

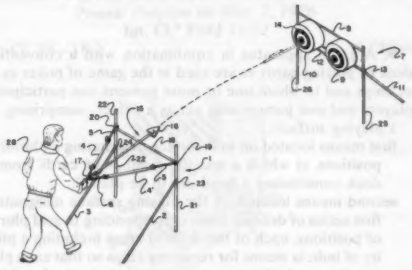
a vehicle engaging member provided at the end of said arm remote from said inner and outer hub portions, whereby an actuating impulse applied to said handle by a child-user is translated into a vertical and arcuate motion of said vehicle engaging member into and along the path of travel of a toy vehicle to be propelled.

3,998,461

ARCHERY PROJECTOR AND TARGET

William G. Bennett, P.O. Box 393, Slidell, La. 70458

Filed Sept. 26, 1975, Ser. No. 617,093
Int. Cl.² A63B 71/02
U.S. Cl. 273—101 **3 Claims**



1. A missile and target toy including

a target;

target support means for mounting and supporting said target;

a missile; and

stationary, missile propelling means for aiming and propelling said missile at said target, said stationary, missile propelling means comprising:

an H-shaped structure having at least two generally vertically disposed legs separated from each other a substantial distance and a missile support bar for said missile supported by said legs but below their uppermost extremity in at least a generally horizontal disposition between said legs, the lower tip of each of said legs penetrating the ground, angle support leg means attached to said H-shaped structure emanating down and back away from the direction of said target, said missile support bar at its central portion being straight, undeviated and free of any obstructions projecting above its upper surface and of any indentations extending below its upper surface for a sub-

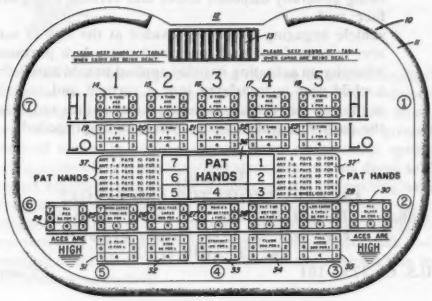
stantial distance along its length, the missile being rested on said upper surface for aiming and propelling thereof by said means and being free to be moved laterally on said central portion a substantial distance along the straight, undeviated and free portion of said bar, allowing great freedom and latitude in the aiming and positioning of said missile with respect to the center portion of said bar.

3,998,462

POKER TYPE GAME APPARATUS

Joseph Goott, P.O. Box 1363, Great Falls, Mont. 49403

Filed May 14, 1975, Ser. No. 577,544
Int. Cl.² A63F 3/00
U.S. Cl. 273—130 H 14 Claims



9. A game apparatus in combination with a conventional deck of playing cards as are used in the game of poker as well as chips and in which one or more persons can participate as players and one person is to act as a dealer, comprising:

a playing surface;

first means located on said surface designating a plurality of positions at which a specific number of cards from the deck constituting a hand are to be placed;

second means located on the playing surface designating a first series of defined areas corresponding to said plurality of positions, each of the defined areas including a plurality of indicia means for receiving chips so that each player can guess whether one or more cards in the hand has a value of "9", "10", Jack, Queen, King, or Ace by placing one or more chips on a respective indicia means of one or more defined areas in the first series;

third means located on the playing surface for designating a second series of defined areas corresponding to said plurality of positions, each of the defined areas including a plurality of indicia means for receiving chips so that each player can guess whether one or more cards in the hand has a value of "2", "3", "4", "5 ", "6", or "7" by placing one or more of the chips on a respective indicia means of one or more defined areas in the second series:

fourth means located on the playing surface designating a third series of defined areas, each of the defined areas including a plurality of indicia means for receiving chips so that each player can guess whether the hand consists of all red cards, all high cards, all low cards, all black cards, all face cards, a pair of "6's" or better, a pat "7" or better by placing one or more chips on a respective indicia means of one or more defined areas in the third series; and

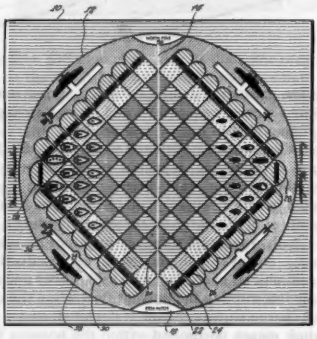
fifth means located on the playing surface designating a fourth series of defined areas, each of the defined areas including a plurality of indicia means for receiving chips so that each player can guess whether the hand consists of two pairs, three of a kind, a straight, or a full house by placing one or more chips on a respective indicia means of one or more defined areas in the fourth series.

3,998,463

NAVAL COMBAT GAME

Joseph Zumchak, 703 Ackerman Ave., Glen Rock, N.J. 07452

Continuation-in-part of Ser. No. 450,608, March 13, 1974, abandoned. This application May 15, 1975, Ser. No. 577,944
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 BB 9 Claims

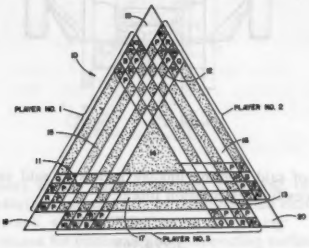


1. In a naval warfare game, the combination of a gameboard having thereon a playing field including a square area of individual checker squares forming the open sea, a perimeter of one row of squares of the same size as the checker squares extending therefrom and completely surrounding all four sides of the square area and forming coastal waters, a square of the coastal waters respectively connected to a square of the open sea, and individual tabular blocks extending from each of the coastal water squares on all four sides and forming seaports, said squares of the open sea, squares of the coastal waters and seaports all defining game piece positions, ans two distinguishingly identifiable sets of game pieces, each game piece being of a size capable of occupying and fitting within a single square and representing a naval vessel, each game piece including a prescribed amount of a particular naval characteristic representative of the respective naval vessels, wherein said presribed amount represents the number of position moves which the repsective game piece has with relationship to the game, wherein said gameboard playing field further comprises a center line diagonally bisecting the square area of individual checker squares forming an Eastern and Western hemisphere on either side thereof, two corner areas respectively positioned adjacent the other diagonally opposed corners of the square area forming canal seaports, four areas respectively positioned adjacent each of the four sides of the square area on the outside of the seaports forming naval airbases, and a circumscribing circle about the entire playing field forming an entire sphere.

3,998,464
THREE PLAYER CHESS GAME BOARD

Daniel H. Poturalski, 6694 S. Franklin St., Littleton, Colo. 80122

Filed May 16, 1975, Ser. No. 578,280
Int. Cl.² A64F 3/02
U.S. Cl. 273—131 KN 7 Claims

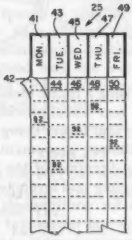


1. A game apparatus having the peripheral configuration shown in FIG. 1 of the drawing and having on its surface the game pattern shown in said FIG. 1; together with three visually distinguishable sets of chess pieces for playing the game.

3,998,465
TELEPHONE RANDOM NUMBER GAME

Donald C. Mascola, 230 Harvard Road, Linden, N.J. 07036

Filed Mar. 24, 1972, Ser. No. 237,866
Int. Cl.² A63F 3/06
U.S. Cl. 273—139 5 Claims



1. A method of gathering random intelligence in a number game, said method comprising the steps of:

providing a source of numerical intelligence including a plurality of elements each having an alphabetical-numerical combination of at least one letter and at least one digit providing different numbers,

randomly selecting a first predetermined quantity of said elements of said source and registering said letters and numbers of said first predetermined quantity in a first isolated group,

randomly selecting at least a second predetermined quantity of said elements of said source and registering said letters and numbers of said second predetermined quantity in a second isolated group,

concealing said first and second isolated groups independently from one another,

providing a plurality of carrier members, said carrier members being separate and apart from said first and second isolated groups,

representing a portion of said source on each of said carrier members in similar row and column arrangements with the numerical intelligence on one carrier member differing from the numerical intelligence on another carrier member, said row being formed of said letters and said column being formed of said numbers associated with said letters respectively,

distributing said carrier members to various participants with said first and second isolated groups being maintained at one location,

exposing all of said first quantity of letters and numbers in said first group at a predetermined time,

allowing sufficient time for the participants to determine from the exposed first group which of said numerical intelligence represented on said carrier members coincides therewith to obtain a winner of said number game having a particular orientation denoted by the coinciding numerical intelligence represented on one of said carrier members,

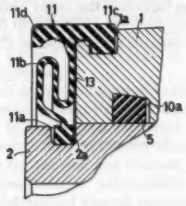
exposing all of said quantity of letters and numbers in said second group after said sufficient time during which no winner has been obtained by said exposed first group, and

allowing a second sufficient time for the participants to determine from the exposed first and second groups which of said numerical intelligence represented on said carrier members coincide therewith to obtain said winner of said number game having said particular orientation denoted by the coinciding numerical intelligence represented on one of said carrier members which was determined by said exposed first and second groups.

3,998,466
FLEXIBLE SEALING BOOT

Toshio Kondo, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Aug. 30, 1974, Ser. No. 501,975
Claims priority, application Japan, Aug. 31, 1973, 48-102981
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² F16J 15/52
U.S. Cl. 74—18.2 3 Claims



1. A sealing boot of elastic material for use in a cylinder and piston assembly of a vehicle brake system comprising, as integrally formed parts thereof:

an inner sleeve portion for elastic mounting in a peripheral groove of said piston,

an outer sleeve portion for elastic mounting in a peripheral groove of said cylinder, and

a flexible bellow portion connecting said inner sleeve portion to said outer sleeve portion,

said outer sleeve portion being provided with an integral thick flange portion which interconnects said bellow sleeve portion and said outer sleeve portion and which extends axially with respect to said cylinder from said peripheral groove of said cylinder beyond the outside of an open end of said cylinder such that the entire axial length of the outer portion of said boot includes a substantially thickened portion which comprises said outer sleeve portion and said flange portion.

3,998,467

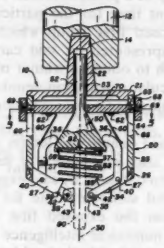
TOOL CHUCK FOR A DRILL PRESS

Tony Petkovich, 3045 W. 5th Ave., Vancouver, British Columbia, Canada (V6K 1T8)

Filed Aug. 19, 1975, Ser. No. 605,891

Int. Cl.² B23B *31/16, 31/18*

U.S. Cl. 279—37 6 Claims



1. A tool chuck for a machine having a rotatable driven part, comprising a sleeve having an open end and an opposite end connectable to said machine part, a plurality of levers circumferentially spaced apart around the open end; said levers each having an outer end, an inner end, and an intermediate portion, pivot means connecting the intermediate portions to the sleeve whereby the outer ends are swingable towards and away from an axis of rotation of said sleeve, an axially movable cam member supported within the sleeve, spring means urging the inner ends into engagement with the cam member, said outer ends being moved radially with respect to the open end in response to axial movement of said cam member, said cam member being shaped to move the outer ends of the levers inwardly when said cam member is moved axially in a direction away from the open end of the sleeve and to move said outer ends outwardly in cooperation with the spring means when said cam member is moved in the opposite direction, and said cam member having an end face adapted to be abutted by a tool inserted between and initially slidably held by the outer ends, whereby said tool when applied to a workpiece by axial movement of the driven part of the machine sliding between the outer ends moves the cam member axially away from the open end so that the outer ends are swung radially inwards into rotational driving engagement with the tool.

3,998,468

COLLISION RESPONSIVE STEERING BLOCKING SYSTEM

Wilhelm Stegmaier, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

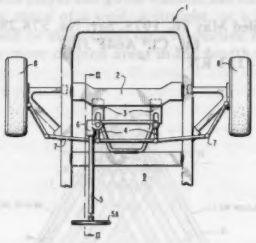
Filed Nov. 29, 1974, Ser. No. 528,495

Claims priority, application Germany, Dec. 1, 1973, 2359943

Int. Cl.² B60R *21/10*

U.S. Cl. 280—87 C 17 Claims

1. A steering system for motor vehicles of the type having an end section, a driver accommodating space, a steering wheel disposed in said driver accommodating space, and steering linkage means supported at said end section and connected to said steering wheel for transmitting turning movements to wheels of the vehicle, wherein said end section includes means engageable with said steering linkage means in response to a predetermined displacement of said end section toward the driver accommodating space caused by an impact against said end section, said engageable means forcing said steering linkage means to a predetermined position and blocking further



rotation of said steering linkage means as said end section experiences further collision forces.

3,998,469

BICYCLE WITH DRIVE LEVERS

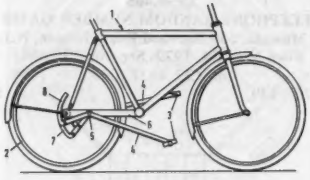
Frans Willem Ruys, Utrechtseweg 19, De Bilt, Netherlands

Filed Apr. 21, 1975, Ser. No. 570,087

Claims priority, application Netherlands, Apr. 23, 1974, 7405462

Int. Cl.² B62M *1/04*

U.S. Cl. 280—254 7 Claims



1. In a bicycle comprising a frame including a pair of forked rear portions, a shaft, a rear wheel provided with a hub, a first and second drive lever, said levers being pivotally connected to said frame for oscillatory movement about a pivot axis transverse to the riding direction of the bicycle, transmisson means for drivingly coupling said levers to said rear wheel, and synchronization means for continuously connecting said levers for synchronous pivotal movement in opposite sense of rotation wherein the improvement is comprised of

a. said transmission means including

i. a first gear segment on each of said drive levers and a second gear segment on only one of said levers,

ii. two one-directional couplings rotatably mounted about said shaft, each of said couplings including a driving part and a coupling element, each of said driving parts having fixedly connected thereto a gear wheel for enmeshing a respective one of said first gear segments, said coupling elements connected to said hub whereby the driving force applied to each of said driving parts is transmitted to said hub such that said hub is rotated in a sense compatible with the riding direction of the bicycle,

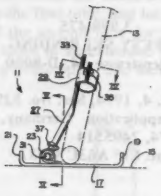
b. said synchronization means including, a second gear wheel fixedly connected to the driving part of one of said one-directional couplings and enmeshing said second gear segment, said second gear segment on the one drive lever and the first gear segment on the other drive lever being arranged at diametrically opposite sides of said shaft whereby said synchronous pivotal movement in opposite sense of rotation is achieved, and

c. clamping means for fixedly connecting said shaft to each of said forked rear portions, whereby all of said gear wheels are disposed between said forked rear portions.

3,998,470
AUXILIARY MEANS FOR USE WITH A KICKSTAND

Thomas J. Houston, 52 Rockwell Road, Jackson, Tenn. 38301

Filed May 6, 1975, Ser. No. 574,904
Int. Cl.² B62H 1/02
U.S. Cl. 280—301 6 Claims



1. Auxiliary means for use with a kickstand of a two-wheeled vehicle to substantially increase the load bearing area of the kickstand, said auxiliary means comprising:

a. plate means for contacting the supporting surface of the vehicle when the kickstand is in an in-use position to substantially increase the load bearing area of the kickstand;

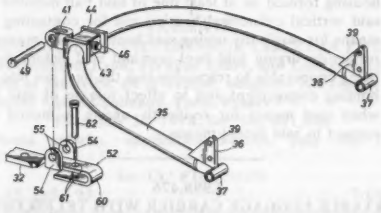
b. attachment means for pivotally mounting said plate means to the kickstand, said attachment means comprising a pivot member having a first end for pivotal attachment to said plate means and having a second end, and means for removably clamping said second end of said pivot member to the kickstand; and

c. spring means disposed between said attachment means and said plate means for urging said plate means to a first position substantially aligned with the kickstand to prevent said plate means from interfering with the operation of the vehicle when the kickstand is in a stored position and wherein the supporting surface of the vehicle will cause said plate means to pivot about the kickstand from the first position to a second position substantially beneath the ground engaging portion of the kickstand and substantially aligned with the supporting surface of the vehicle when the kickstand is moved from the stored position to the in-use position.

3,998,471
TRAILER HITCH ASSEMBLY

Fritz Lutchemeier, Houston, Tex., assignor to Terrain King Corporation, Houston, Tex.

Filed Oct. 10, 1975, Ser. No. 621,587
Int. Cl.² B60D 1/02
U.S. Cl. 280—492 1 Claim



1. A trailer hitch assembly for attaching the tongue of a trailer mower to the draw bar of a tractor, the combination comprising:

a swivel pin extending generally horizontally and generally parallel with the line of travel of said tractor and mower connected to said tongue for accommodating 360° roll type relative movement;

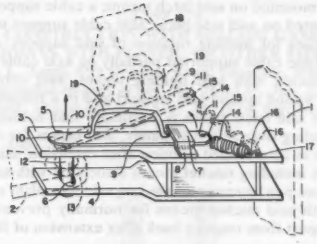
a first clevis connected to the forward end of said first pin, said first clevis having a pair of pin holes defining a transversely extending generally horizontal axis;

and a swivel member in the form of a double clevis including a generally U-shaped portion arranged for mounting over said draw bar and having pin holes defining a generally vertical axis for receipt of a pin for attaching said swivel member to said draw bar to thereby accommodate yaw type relative movement, and with the upper leg of said U-shaped member having rigidly attached to the forward end thereof a pair of upstanding lugs each of which has a pin hole therethrough defining a generally transversely extending horizontal axis for receipt of a pin for attaching said lugs to said first clevis to accommodate pitch type relative movement.

3,998,472
HITCH PIN DEVICE

Ted A. Tretter, Fort Ripley, Minn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 11, 1975, Ser. No. 639,632
Int. Cl.² B60D 1/02
U.S. Cl. 280—515 2 Claims



1. A hitch pin device for releasably coupling one vehicle to another, said hitch pin device comprising

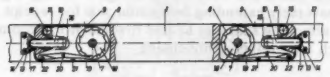
a pair of spaced substantially parallel plates affixed to and extending from a vehicle one above the other, said plates having bores formed therethrough in substantially perpendicular alignment;

a pin latch affixed at one end thereof to the upper one of the plates in a manner whereby the pin latch extends substantially parallel to and spaced from said one of said plates and is free from said one of said plates along its entire length except for the one end thereof;

a pin device comprising a substantially bar-like pin bar having first and second spaced opposite ends and a pin affixed to the first end of the pin bar and removably extending from the one of the plates through the bores of both said plates in a manner whereby a ring coupled to another vehicle and positioned around the pin is secured on said pin by and between said plates; and

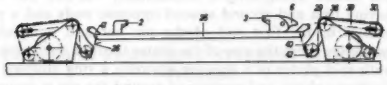
spiral spring means having first and second spaced opposite ends, affixed at its first end to the second end of the pin bar and affixed at its second end to the said one of said plates at a point spaced from the second end of the pin bar on the opposite side of the pin latch from the bores, said spring means applying a force to said pin bar maintaining said pin bar between the pin latch and said one of said plates about said pin as a pivot whereby said pin is removable from said bores upon the application of manual force against the force of the spring to move the second end of the pin bar so that the pin bar is moved about the pin as a pivot out of the pin latch thereby permitting the pin bar to be raised above said one of said plates to remove the pin from said bores.

3,998,473
SAFETY SKI-BINDING
Johann Schmidt, Neu-Germering, Germany, assignor to Hannes Marker, Garmish, Germany
Filed Apr. 16, 1975, Ser. No. 568,528
Claims priority, application Germany, Apr. 24, 1974, 2419326
Int. Cl.² A63C 9/086
U.S. Cl. 280—618 8 Claims



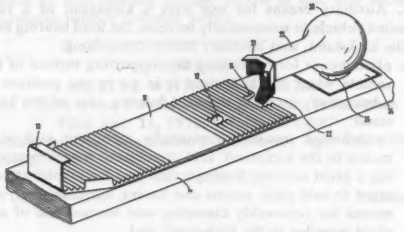
6. A ski binding for coupling a ski boot on a ski comprising: a sole plate arranged for positioning in underlying contact with the ski boot and for detachable connection thereto; a first sole holder mounted on said sole plate for holding the front end of said boot; a second sole holder mounted on said sole plate for holding the rear end of said boot; at least one mounting means for securing said sole plate to cooperating holding means on the ski, said mounting means including slidable latch means for cooperating with said holding means, and abutment means on said latch means cooperating with said sole plate for limiting the extension of said latch means; a first pulley means rotatably mounted on said latch means; a cable support rotatably mounted on said sole plate; said cable support including spring means for limiting rotation of said support, an elongated flexible cable supported partially on said cable support and connected with said holding means, said cable being normally wound around said support and in a retracted position when said latch means is proximate said holding means and extending over said first pulley, and means for retaining said cable in an extended position after extension, said retaining means including ratchet means associated with said cable support and pawl means mounted on said sole plate and associated with said ratchet means for normally preventing said cable support from rotating back after extension of the cable.

3,998,474
SAFETY SKI-BINDING
Hannes Marker, Garmisch-Partenkirchen, and Heinz Hornschemeyer, Oberammergau, both of Germany, assignors to Hannes Marker, Germany
Filed Apr. 16, 1975, Ser. No. 568,527
Claims priority, application Germany, Apr. 24, 1974, 2419326
Int. Cl.² A63C 9/086
U.S. Cl. 280—618 7 Claims



1. A safety ski-binding for connecting a ski boot to a ski, the binding comprising: a latching mechanism acting between the boot and the ski for retaining the boot on the ski against relative vertical and horizontal movement under normal operating conditions; said latching mechanism including a housing fixedly mounted relative to one of said boot or ski; biasing pulley means rotatably mounted in said housing; means for biasing said biasing pulley means in one direction; cable means, one end of which is mounted on said biasing pulley and hence is biased therewith; a latch member pivotably mounted on said housing for movement toward and away from the other of said boot or ski; guide pulley means mounted on said latch member for guiding the opposite end of said cable means; a catch member fixed relative to said other of said boot or ski for associating with said latch member and, when so associated, for retaining the boot on the ski against relative vertical movement; connector means for fixing said other end of said cable means relative to said catch member so that said movably mounted latch member is urged toward said catch member as a result of the biasing force exerted on said cable means by said biasing pulley.

3,998,475
SAFETY SKI BINDING
Erich Eckart, Oettingenstrasse 54, D-8000 Munich 22, Germany
Filed Dec. 4, 1974, Ser. No. 529,400
Claims priority, application Germany, Dec. 8, 1973, 2361245; Feb. 5, 1974, 2405514
Int. Cl.² A63C 9/081
U.S. Cl. 280—623 12 Claims



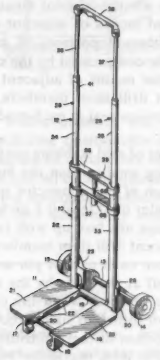
1. A safety binding for attachment of a ski to the boot of a skier comprising, in combination:

a plate coextensive with the length of the boot; means rotatably mounting said plate to the ski at the center of rotation of the leg of the skier; means mounted at one end of said plate for receiving the toe of said boot, and a heel holding element secured to the ski adjacent the other end of said plate, said heel holding element comprising: a vertical cylindrical bearing rod having a spherical upper end and a lower end fixedly secured to the ski; a ball member pivotally mounted circumferentially about said vertical cylindrical bearing rod for pivotal movement in a horizontal plane; a housing surrounding said ball member for pivotal movement relative to said ball member in the vertical direction, said housing having a heel jaw extending in a direction from said vertical cylindrical bearing rod toward said plate, and means for permitting the vertical pivotal movement of said housing relative to said ball member; means mounted within said housing for resiliently urging said extended heel jaw into holding engagement with the heel of a boot on the ski; and detent means for resisting horizontal and vertical movements of said housing formed on at least one of said ball member and said vertical cylindrical bearing rod for contacting said means for resiliently urging said heel jaw, said means for resiliently urging said heel jaw and said detent means being cooperable to releasably bias the heel jaw into said holding engagement and to effect release of said boot when said means for resiliently urging is moved with respect to said detent means.

3,998,476
PORTABLE LUGGAGE CARRIER WITH TELESCOPING HANDLE
Eugene Anthony Kazmark, Sr., 5 Remin Lane, Joliet, Ill. 60433
Filed Sept. 29, 1975, Ser. No. 617,868
Int. Cl.² B62B 1/12
U.S. Cl. 280—655 10 Claims

1. A telescoping handle assembly for a portable luggage carrier having a wheel-equipped base, the handle assembly comprising a pair of spaced-apart parallel tube assemblies,

each of the tube assemblies having upper and lower ends, the lower ends being attached to the base and extending upwardly therefrom, a handle extending between the upper ends of the tube assemblies and secured thereto, and a release bar assembly extending between the tube assemblies intermediate the ends thereof, each of the tube assemblies including a first tube extending upwardly from the base, a second tube telescopingly received by the first tube, and locking means carried by the lower end of the second tube for releasably locking the first and second tubes in an extended position, the first tube having an opening in the upper end thereof through which the



locking means extends when the first and second tubes are in the extended position, the release bar assembly including a first bar extending between the first tube of each of the tube assemblies and secured thereto and a second bar extending between the first tube of each of the tube assemblies and slidably mounted thereon, the second bar being movable toward the first bar and having lock-engaging portions engageable with the locking means of the tube assemblies as the second bar moves toward the first bar whereby each of the locking means can be pushed inwardly through the opening in the first tube to release the first and second tubes and the second tube can telescope within the first tube.

3,998,477

NON-RIGID CONNECTION FOR CIRCULAR PIPES

Henri Delahaye, Lyon; Fernand Fabre, and Lucien Guerrera, both of Marseille, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

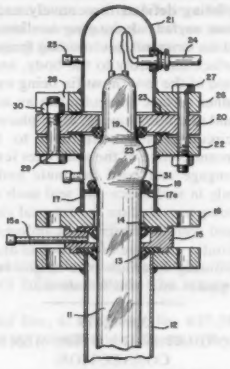
Filed July 24, 1974, Ser. No. 491,456

Claims priority, application France, July 30, 1973, 73.27775

Int. Cl.² F16L *35/00*

U.S. Cl. 285—93 **7 Claims**

1. A non-rigid pressure seal device comprising a rigid circular pipe, a second circular pipe having a bulb-shaped zone with toroidal flexible gaskets surrounding said second circular pipe and disposed adjacent to each end of the bulb-shaped zone; said bulb-shaped zone resting on and supported by at least one of said toroidal gaskets; a housing including means to postionally hold said toroidal gaskets adjacent to each end of the bulb-shaped zone; at least one double-lipped gasket attached to said second circular pipe in scaling and sealing engagement therewith a point below the toroidal flexible gaskets; clamping means for mounting said double-lipped gaskets to said rigid circular pipe; means for securing said



housing to said clamping means whereby said second circular pipe is resiliently supported within said rigid pipe.

3,998,478

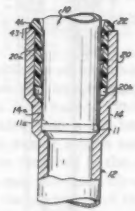
JOINT CONSTRUCTION WITH SEALING GASKET FOR JOINTS WITH PLASTIC OR OTHER PIPES

William L. Zopfi, 899 Drayton Road, Ferndale, Mich. 48220

Continuation-in-part of Ser. No. 269,137, July 5, 1972, abandoned. This application Aug. 30, 1974, Ser. No. 496,371

Int. Cl.² F16L *17/02*

U.S. Cl. 285—110 **15 Claims**



1. For use with plastic or other pipes of a size of about 1½ inches and larger, a joint construction wherein:

one piping element has a smooth plain spigot or cylindrical male end;

a second piping element has a female end receiving said male end,

said female end having an inner length portion with an inside diameter tapering inwardly from a size slightly larger than the outside diameter of said male end so that it as a substantially cylindrical socket circumferentially snugly receives the male end for coaxial alignment;

said female end having an outer length portion interiorly cylindrical as a bell with an inside diameter defining an annular space with and around the male end; and

improved sealing means comprising a pliable annular thin ribbon-bodied gasket received within the outer length portion in said annular space,

in axial length about equal to that of the said outer length portion, but affording an endwise clearance of the gasket inner end from the bottom of said annular space as emplaced therein, before insertion of a spigot;

said gasket being of smooth surfaced polyvinyl chloride or the like elastomer,

said gasket having a plurality of at least three integral pliable internal annular gripping fins axially spaced on the inner circumference of its body,

the said fins being defined respectively each by a female conical outer surface decreasing in diameter axially inwardly and an inner surface running from the said outer conical surface outwardly to the body, and

all fins outward of the innermost fin being each undercut to have the inner surface thereof make an acute angle with the body and said body having, as emplaced, a cylindrical external circumference conformed to the cylindrical interior circumference of the said outer length portion, to sealingly engage and hold the male end and hold the gasket firmly in said space and seal such space;

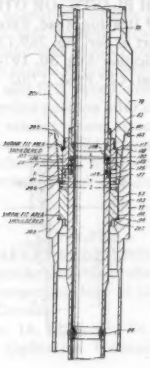
said gasket being provided on the external circumference of its outer end with an integral circumferential flange engaging the outer end edge of said bell to anchor the gasket outer end during insertion of a spigot end through the emplaced gasket into said female end.

3,998,479

DUAL CONDUIT DRILL STEM MEMBER AND CONNECTION

William W. Bishop, Midland, Tex., assignor to Smith International, Inc., Midland, Tex.

Filed Dec. 23, 1974, Ser. No. 535,373
Int. Cl.² F16L *47/00*
U.S. Cl. 285—133 A **9 Claims**



1. Dual flow passage drill stem member comprising:

a tube having a flow passage therethrough,

a pipe about said tube providing a flow passage between said pipe and tube,

connector means at each end of said tube for making connection with correlative connector means on the tube of an adjacent drill stem member,

joint means at each end of said pipe for making a rotary shouldered connection with correlative joint means on the pipe of an adjacent drill stem member,

said connector means and said joint means at one end of said drill stem member being correlative to those at the other end of said drill stem member,

said connector means at one end of said tube comprising a tubular pin having an annular external shoulder thereabout facing the extreme end of the pin and an external smooth cylindrical stabbing portion between said shoulder and said end of the pin and an external annular groove therearound adjacent the shoulder between the shoulder and the stabbing portion and a seal ring disposed in the groove having a protuberant portion lying against the shoulder,

said connector means at the other end and said tube comprising a tubular box having an annular internal shoulder therewithin facing the mouth of the box and an internal smooth cylindrical stabbing portion between said shoulder and said mouth of the pin and an internal annular groove therearound adjacent the shoulder between the shoulder and the stabbing portion thereof and a seal ring disposed in the groove having a protuberant portion lying against the shoulder,

the end of said pin and the mouth of said box of said tube connector means providing compressing surfaces which are positioned to compress protuberant portions of seal rings of correlative connector means of adjacent drill stem members when said joint means are made up with correlative joint means of adjacent drill stem members, and said protuberant portions of said seal rings being positioned to be compressed by the compressing surfaces of the connector means of adjacent drill stem members with said joint drill stem members, thereby to form a double compression seal at each made up pair of connector means,

the outer diameter of said stabbing portion of the connector means pin being smaller than the inner diameter of said stabbing portion of the connector means boxy by a distance of the order of at least 0.1 inch, whereby when said connector means are box up with correlative connector means on adjacent drill stem members there is formed an annulus between each pair of pin and box stabbing portions, closed off at the ends by the seal rings to prevent the entrance of detritus when the connector means are made up, and of sufficient size to receive without harm to the stabbing portion surfaces detritus paticles of the order of at least **0.050** inch maximum transversesection, and said stabbing portions do not fret under expected bending moments of said joint means,

said joint means at one end of said pipe comprising a tubular pin having an annular shoulder thereabout and an externally tapered and threaded portion between the shoulder and the extreme end of the pin and an unthreaded portion between said shoulder and said threaded portion thereof,

said joint means at the other end of said pipe comprising a tubular box adapted to receive such a joint pin and the mouth of the joint box providing a shoulder adapted to engage the shoulder on such a joint pin and having an internally tapered and threaded portion adapted to engage the threaded portion on such a joint pin and having an unthreaded portion between said mouth and the threaded portion of the box thereof,

said shoulders on said joint pin and joint box limiting the axial makeup of said joint pin and joint box with correlative joint means on adjacent pipes,

the connector means of each end of the tube being affixed to the joint means at the same end of the member to prevent relative axial motion therebetween so that the axial makeup of said connecotr means with correlative connector means on adjacent tubes is limited by said shoulders on the joint pin and joint boxof said joint means on the pipe.

3,998,480

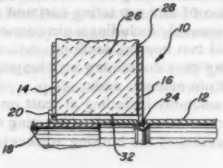
TAKE-OFF FITTING FOR LOW PRESSURE NON-METALLIC DUCT SYSTEMS

Jack L. Twedell, 6749 S. Delaware, Littleton, Colo. 80120

Filed Dec. 4, 1974, Ser. No. 529,462
Int. Cl.² F16L *5/00*
U.S. Cl. 285—189 **7 Claims**

1. A take-off fitting for use in low pressure non-metallic duct systems of the type including a walled member with at least one planar wall and having an opening in said planar wall thereof which comprises: a tubular sleeve positionable in said opening and having means adjacent one end thereof defining a stop and an annular groove spaced from said stop toward the other end a distance substantially equal to the thickness of

said planar wall, said sleeve and stop means being of a shape and size to pass into the interior of said walled member through the opening in said planar wall along a straight line perpendicular thereto; a sealing ring having an opening therein of a shape and size to receive said sleeve with a free sliding fit, said ring being in abutting relation to the stop means and planar wall to bridge and seal any gap left between



said opening in the walled member and the outside of the sleeve; and a split lock ring positionable in said groove and having an opening therein of a diameter less than the outside diameter of the sleeve and an outside diameter larger than said opening, said ring being springable to the degree necessary to pass onto said sleeve and detachably lock into the annular groove therein.

3,998,481

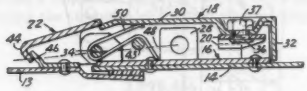
DRAW AND PULL LATCH

Leo E. Anthone, Little Canada, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 1, 1975, Ser. No. 573,521

Int. Cl.[2] B65D *45/06;* **E05C** *5/00, 13/02, 19/14*

U.S. Cl. 292—104 **2 Claims**



1. A draw and pull latch comprising:

a rectangular base plate for attachment to one portion of the structure to be latched, said base plate at one end being formed along its two opposed edges with similar upstanding pivot flanges, being formed at its opposite end with at least one upstanding latching hook and being formed intermediate its end with an upstanding locking flange having an aperture therethrough,

a rectangular body having a top wall, two depending side walls and one depending end wall, pivoted at its open end on said base plate on the outside of said base plate pivot flanges, said body extending over and covering said base plate in the latched position and being formed with an aperture in one side wall which, in the latched position, is in alignment with said locking flange aperture to permit padlocking of said latch through said aligned apertures,

a latching plate pivoted on said body and formed with a latching flange in alignment with and opposed to said latching hook on said base plate, said latching plate being resiliently urged to a latching position by a torsion spring and having its pivot extend through said body and there formed for engagement for pivoting said latching plate to an unlatched position against said torsion spring, and

a draw and pull nose pivoted at one end on the outside of the opposed body walls adjacent the pivot axis of said body on said base plate, the pivot axis of said draw and pull nose being spaced from the open end of the body further than and parallel to the body pivot axis on said base plate, said nose covering the open end of said body and having a depending end wall turned back toward its opposed end for engaging a keeper on the structure to be latched, a plane through the keeper engaging area on said end wall and the pivot axis of said body on said base plate lying between the pivot axis of said draw and pull nose on said base plate when said latch is in a fully latched position with said nose engaging a keeper and said latching hook engaging said latching flange of said latching plate.

3,998,482

LOCK MEANS

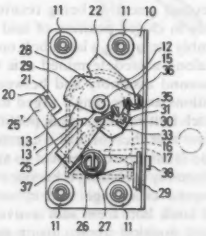
Yoshiharu Nozaki, 22 6Banwari, Nawa-Cho, Tokai, Aichi, and Ichio Ikeda, 45 2-Chome Nakade-Cho, Atsuta, Nagoya, both of Japan

Filed Dec. 4, 1975, Ser. No. 637,508

Claims priority, application Japan, Dec. 18, 1974, 49-146106

Int. Cl.[2] E05C *3/26*

U.S. Cl. 292—216 **4 Claims**



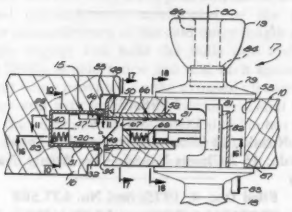
1. A lock means for doors of an automobile comprising a lock base mountable on the door of the automobile, a rotary shaft supported by the lock base, a ratchet mounted on the rotary shaft and provided with a full-latch claw and a half-latch claw, said ratchet having a form suitable to be actuated by a striker attached on the body of the automobile in a lock establishing direction, said full-latch claw and said half-latch claw being formed on the periphery of the ratchet so that the latter claw may lead the former claw when said ratchet is rotated in the lock establishing direction, a hindering piece overlapped on the ratchet and adapted loosely around said rotary shaft, a holding piece engageable at its periphery with the periphery of the overlapped ratchet and hindering piece and supported rotatably by said lock base, said hindering piece being related to said ratchet so that the hindering piece may rotate between an envelope position and a non-envelope position, in said envelope position said hindering piece enveloping the contour of said half-latch claw to eliminate the engagement between said half-latch claw and said holding piece, in said non-envelope position said hindering piece not enveloping the contour of said half-latch claw to allow the engagement between said half-latch claw and said holding piece, a first biasing means to bias said ratchet against said lock base in the unlock establishing direction, a second biasing means to bias said holding piece to let the same approach said ratchet, and an interconnecting means interposed between said holding piece and said hindering piece, said interconnecting means being constructed so that it can actuate said hindering piece from said envelope position to said non-envelope position after the substantial rotation of the ratchet in the lock establishing direction and actuate said hindering piece from the non-envelope position to the envelope position after the substantial rotation of the ratchet in the unlock establishing direction.

3,998,483

LATCH MECHANISM WITH JAMB MOUNTED LATCH BOLT

Young H. Yan, 820 Alpine St., Apt. No. 3, Los Angeles, Calif. 90012

Filed June 30, 1975, Ser. No. 591,446
Int. Cl.[2] E05C *13/02*
U.S. Cl. 292—254 5 Claims



1. A latch mechanism comprising

a first assembly to be mounted to a jamb; and

a second assembly to be mounted to a member which swings relative to the jamb between open and closed positions, with said second assembly being received opposite said first assembly in closed position of said member;

said first assembly including a latch bolt mounted for sliding movement along a predetermined axis toward and away from said second assembly and between active and retracted positions and yieldingly urged to said active position, said latch bolt having a peak portion with a latching surface at one side thereof and a camming surface at its opposite side inclined with respect to said axis;

said second assembly including a keeper structure having a portion adapted to engage said camming surface and deflect said latch bolt from said active position toward said retracted position upon closing movement of said member, and to then release said latch bolt for return to said active position to retain said member in closed position;

said second assembly including a housing, a retracting part which is mounted by said housing for sliding movement in a direction to move essentially along said axis when said member is in its closed position, and manually operated means for sliding said retracting part axially toward said bolt to retract it;

said retracting part having an end portion which is narrower than said latch bolt in the direction of closing movement of said member, and which is located axially opposite said peak portion of the latch bolt in said closed position of said member and is engageable with said peak portion upon axial sliding movement of said part to push the bolt axially from said active position thereof toward said retracted position and thereby free said member for opening movement;

said housing having a wall which is laterally adjacent said end portion of said retracting part, and which in said closed position of said member is axially opposite said camming surface of the bolt, and which defines a side of a passage narrower than said bolt, in the direction of closing movement of said member, through which said end portion of the retracting part projects axially past said wall to engage and act against said peak portion of said bolt;

said second assembly including a spring yieldingly resisting sliding movement of said retracting part in a bolt retracting direction;

said retracting part having a widened portion which is wider than said end portion and is located axially beyond said wall in a direction away from said latch part;

said spring being a coil spring located entirely at one side of said end portion of the retracting part and located axially opposite said camming surface of the latch bolt in the closed position of said member, and acting in opposite directions against said wall and said widened portion of the retracting part to urge the latter to an inactive position thereof;

said housing including two complementary sections meeting in a predetermined plane and one of which slidably contains said end portion of the retracting element, the other of said sections carrying said wall and a part of said widened portion of said retracting part and said spring;

said second assembly including a pin connected at opposite ends to said two housing sections;

said retracting part containing an elongated slot through which said pin extends; and

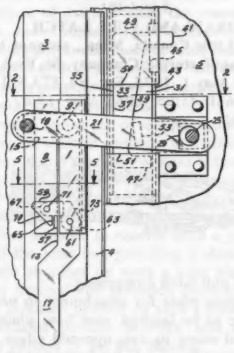
said second assembly including at least one lug projecting from said retracting part into a coacting recess formed in said one section of the housing adjacent said plane.

3,998,484

SLIDING DOOR LOCKING DEVICE

Norbert S. Wolak, Cicero; Leonidas Jaras, Chicago, and Thomas J, Wolak, Cicero, all of Ill., assignors to Evans Products Company, Portland, Oreg.

Filed Jan. 10, 1975, Ser. No. 539,965
Int. Cl.[2] E05C *19/08*
U.S. Cl. 292—283 14 Claims



1. In combination with a sliding door and a relatively stationary member defining the front edge of a door opening, a locking device comprising an actuator mounted on said relatively stationary member, a hasp pivotally secured to said actuator and movable thereby from a rearwardly extended released position to a forwardly retracted locking position, structure mounted on said door spaced rearwardly from the front edge thereof including means for detachable connection to said hasp, means forming a transversely outwardly directed, rearwardly facing, transverse surface on said door between said detachable connection means and the front edge of the door, and a wedge-shaped locking pin vertically movably mounted on said door and slidably engaging said rearwardly facing transverse surface on said door, said hasp being positioned transversely outwardly of said locking pin when connected to said detachable connection means on said door, means on said hasp forming a transversely inwardly directed, forwardly facing, transverse surface thereon between said locking pin and said detachable connection means when said hasp is connected thereto whereby said locking pin is adapted to drop into locking engagement with said rearwardly facing transverse surface on said door and said forwardly facing transverse surface on said hasp when said door is closed, the portion of said hasp located transversely adjacent said locking pin when said door is locked being wholly transversely outboard of said hasp whereby to permit disconnection of said

hasp from said detachable connection means on said door without requiring manual withdrawal of said locking pin from locking position.

3,998,485

BUMPER ARRANGEMENT FOR A VEHICLE EQUIPPED WITH LONGITUDINAL MEMBERS

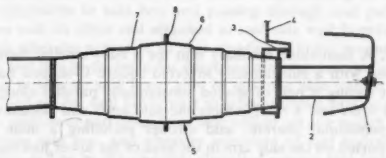
Henning Plütter, Wolfsburg, and Reinhard Breitinger, Hehlingen, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed May 20, 1975, Ser. No. 579,048

Claims priority, application Germany, June 8, 1974, 2427764

Int. Cl.² B60R 19/06

U.S. Cl. 293—70 5 Claims



1. A bumper arrangement for a vehicle, specifically an automobile, equipped with longitudinal structural members that are zonally deformable and a bumper bar connected to the longitudinal members, characterized in that the deformable zones of the longitudinal members each comprise at least two separate oppositely directed stepped-shaped boxes which are joined together, said two stepped-shaped boxes being of different strengths and having their largest cross-sections joined to each other, the stepped-shaped box closest to the vehicle being the strongest of the two stepped-shaped boxes.

3,998,486

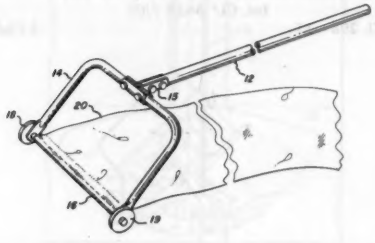
SNOW REMOVER

Robert A. Mittelstadt, Burnsville, Minn., assignor to Avalanche Company, Burnsville, Minn.

Filed Nov. 19, 1975, Ser. No. 633,228

Int. Cl.² E01H 5/02

U.S. Cl. 294—54 19 Claims



1. An apparatus for sliding snow from a roof; comprising

a. a rectangular plastic slide having a length dimension substantially longer than its width dimension, said length dimension forming an elongated slide along the surface of said roof which may overhang the edge of said roof;

b. an edge support rod attached along a width dimension edge of said rectangular slide;

c. a U-bracket having snow-cutting legs attached to said edge support rod; and

d. an elongated pole attached to said U-bracket in spaced alignment with said plastic slide length dimension.

3,998,487

DEVICE FOR THE AUTOMATIC RELEASE OF A CHAIN

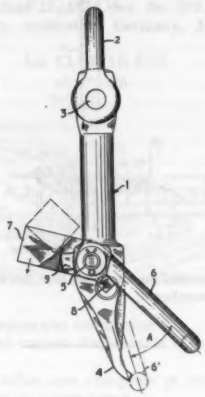
Nunzio Biondo, Via Pasubio 21, Cecina (Leghorn), Italy

Filed Nov. 28, 1975, Ser. No. 635,866

Claims priority, application Italy, Dec. 12, 1974, 13088/74

Int. Cl.² B66C 1/38

U.S. Cl. 294—83 R 2 Claims



1. An improved device for the automatic release of a chain comprising a body provided on top with hooking means and on the bottom with an articulation pin for the ends of the arms of a U-shaped bracket and for a counterweight; wherein said body has below said pin a widened arm whose profile crosses the inner profile of said bracket which, due to its own weight, tends to rest against said arm; wherein further said counter weight is provided with at least an abutting tooth for keeping lifted, in open position with respect to said arm, said bracket; wherein finally is provided a king bolt slidable in a hole in said arm and elastically pushed to project from the arm surface so as to provide a disengageable supporting abutment suitable to prevent said bracket from closing on said arm.

3,998,488

CONNECTING ELEMENT FOR MOVING MEANS

Virgil R. C. Durgan, Tremont, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 12, 1976, Ser. No. 676,081

Int. Cl.² B66C 1/24

U.S. Cl. 294—67 AA 8 Claims

7. Apparatus for controllably connecting lifting means to an item for moving said item to and from relatively inaccessible locations, comprising:

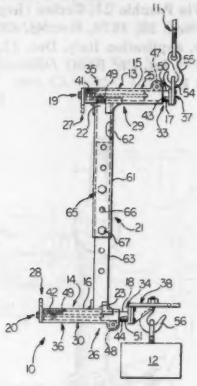
first and second spaced apart frame members each having first and second end portions and a middle portion;

first and second movable members each having first and second end portions, said movable members each being slidably positioned in a respective frame member for longitudinal movement therealong;

first and second moving means each connected to a respective frame member and associated movable member for controllably moving the movable member;

a spacing element connected at one end to the first frame member and at the other end to the second frame member for maintaining the frame members spaced a preselected distance one from the other;

a hook eye element connected to the first end portion of the first movable member; and



a hook connected to the first end portion of the second movable member.

3,998,489

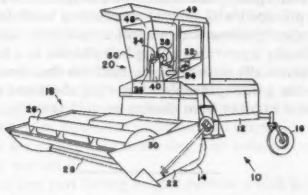
CAB FOR A HARVESTING MACHINE

Edward A. Blakeslee, New Holland, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Continuation of Ser. No. 430,439, Jan. 3, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,395

Int. Cl.² B60J *1/02*

U.S. Cl. 296—28 CV **5 Claims**



1. In a cab for a harvesting machine, the combination comprising:

A. a floor portion;

B. a roof portion spaced above said floor portion;

C. molding material fitted both on said floor and roof portions;

D. transparent members mounted at their lower ends to said molding material on said floor portion and extending upwardly therefrom, and mounted at their upper ends to said molding material on said roof portion, the members being affixed to each other at their adjacent upwardly-extending edges in such a way as to eliminate any obstruction to vision through corners formed by said respective edges;

E. a bracket fitted about each upper and lower end of each of said corners formed by said respective edges of said members for supporting said members in juxtaposition to each other without interfering with the view through said members, each of said brackets seated within the portion of said molding material adjacent the one of said upper and lower ends of said corners about which said bracket is fitted and thereby seated between said molding material portion and such one of said upper and lower ends of said corners.

3,998,490

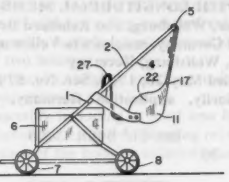
REMOVABLE AUXILIARY SEAT

Victorina Lallave, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 12, 1975, Ser. No. 612,797

Int. Cl.² A47C *15/00*

U.S. Cl. 297—243 **2 Claims**



1. A removable auxiliary seat for a baby stroller having a frame with a substantially inverted square U-shaped handle part having a pair of spaced substantially parallel elongated side arms and a head joining the side arms and substantially perpendicular thereto, said stroller including a main seat supported on the side arm in the area of the lower half thereof and the side arms having an upper half extending below the head, said auxiliary seat comprising

a substantially sling type sheet of flexible material formed with a seat surface having a front edge, a rear edge and a pair of side edges, a back surface extending upwardly from the rear edge of the seat surface and having an upper edge and a pair of side edges, and a pair of sides each extending between a corresponding side edge of the seat surface and a corresponding side edge of the back surface; and

removable fastening means removably affixing each of the sides of the sheet to a corresponding one of the side arms of the handle part of the frame and removably affixing the back surface at its upper edge to the head of said handle part whereby the auxiliary seat is supported at the upper half of the side arms.

3,998,491

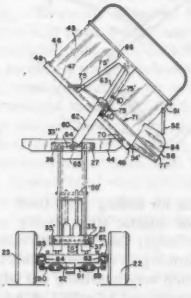
FORAGE TRAILER

Oskar Diem, Richardton, N. Dak., assignor to SOS Consolidated, Inc., Birmingham, Mich.

Filed Feb. 25, 1975, Ser. No. 552,991

Int. Cl.² B62B *1/00*

U.S. Cl. 298—11 **2 Claims**



1. A forage trailer device comprising an upper and lower frame, said lower frame having wheels thereon for rotatably supporting said lower frame, a scizzor-like raising and lowering mechanism connected between said upper and lower

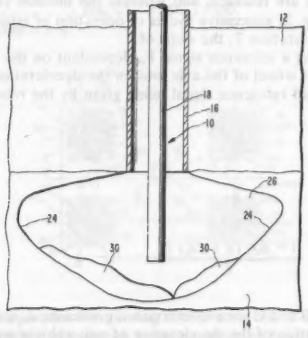
frame, said scizzor mechanism being adapted to rest between the confines of said upper and lower frame when said upper frame is lowered adjacent said lower frame, hydraulic means to raise said scizzor-like pivoting fashion to thereby raise said upper frame in relation to said lower frame, an elongated box above said upper frame, said box having bottom, front and rear and opposing side walls and being pivotally mounted to the upper frame along one side edge of one of said side walls whereby said box may pivot laterally at its length about said pivot to an angle on one side of said upper frame, said box having at least the lower part of said one of said side walls have flanges forming a trough and separable from said box, and pivotally mounted to pivot open away from said box to form an opening in said box, pivotal hydraulic cylinder means having its lower most ends pivotally mounted to said upper frame and its uppermost end pivotally mounted to said box intermediate the height of said box, pulley means mounted to said pivotal cylinder means, flexible cable means having its one end attachable to said box and passing through said pulley means with its other end attached to said side wall forming a trough whereby actuation of said pivoting cylinder means to pivot said box to an angle for emptying also moves said cable means to actuate said lower part of said one side wall to release and enable said lower part to separate from said box to cause said lower part of said one side wall to act as a trough for emptying said box, and whereby actuation of said hydraulic cylinder means in the opposite direction causes said box to pivot back to a horizontal position and also moves said cable in the opposite direction which causes said lower part of said wall to pivot back toward said box to a flush vertical position across said side of box to close said opening in said box.

3,998,492

METHOD FOR SELECTIVELY EXTRACTING MAGNESIUM CHLORIDE HEXAHYDRATE FROM MAGNESIUM CHLORIDE HEXAHYDRATE BEARING MATERIALS IN SITU BY SOLUTION MINING

Charles A. R. Lambly; Irving Leibson, both of Alamo, and Pierre J. Chassagne, San Mateo, all of Calif., assignors to Bechtel International Corporation, San Francisco, Calif.

Filed May 23, 1975, Ser. No. 580,382
Int. Cl.² E21C *37/06, 41/06*
U.S. Cl. 299—4 **13 Claims**



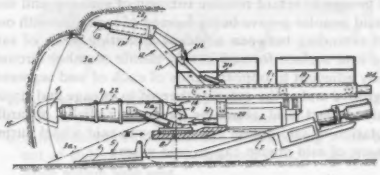
1. A method for the selective, in situ extraction of magnesium chloride hexahydrate from a subterranean bed containing magnesium chloride hexahydrate comprising: filling a hole in a subterranean bed containing magnesium chloride hexahydrate with a solvent to cause it to flow and contact the bed materials and to dissolve the magnesium chloride hexahydrate thereof with said solvent being taken from the group of the lower saturated monohydric aliphatic alcohols containing 1 to 4 carbon atoms; flowing the solvent with magnesium chloride hexahydrate dissolved therein from the bed; and recovering at least portions of the solvent and the insolubles originally in the bed.

3,998,493

COMBINED MILLING AND IMPACT APPARATUS FOR TUNNELING

Friedrich Wilhelm Paurat, Alte Hunxer Strasse 45, 4222 Friedrichsfeld (NDRRH.), Germany

Filed June 25, 1975, Ser. No. 590,083
Claims priority, application Germany, June 26, 1974, 2430606
Int. Cl.² E21D *9/10*
U.S. Cl. 299—56 **5 Claims**



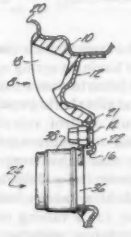
1. A tunneling apparatus comprising:
a track-propelled support displaceable along the floor of a tunnel;
an articulated miller arm swingable at one end about a horizontal axis on said support;
a rotatable milling head on said miller arm engageable with a lower portion of a face wall of said tunnel;
means for rotating said head to mill material away from said lower portion to undercut the upper portion of said wall;
a platform above said milling head displaceable toward and away from said face wall;
an articulated hammer arm having one section pivoted on said platform and another section pivoted on said one section;
a hydraulic hammer on said other section of said hammer arm engageable with said upper portion of said face wall;
hydraulic means for reciprocating said hammer to break material off said upper portion;
means on said support for transporting material milled away and broken off said wall away from adjacent said wall; and
means on said support for swinging said platform and said miller arm independently about respective vertical axes.

3,998,494

WHEEL AND GREASE CAP ASSEMBLY

Edward G. Spisak, 35700 Oakwood Lane, Westland, Mich. 48185

Filed Mar. 21, 1975, Ser. No. 560,997
Int. Cl.² B60B *7/00*
U.S. Cl. 301—37 P **3 Claims**



1. A wheel and grease cap assembly including a metal wheel

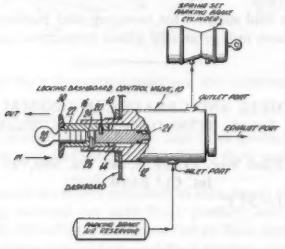
having wheel mounting holes arranged on an annular circle and a plastic member attached to and covering the wheel, said plastic member having a portion extending radially inward of said circle and between said mounting holes and having an inner annular surface adjacent said circle, an annular groove formed in said inner annular surface and having a radially inward facing bottom portion, a cap attached to said plastic member and having a retaining ring axially extending inside of said inner annular surface of said plastic member, said cap having a plurality of circumferentially spaced attaching portions formed on said retaining ring and located in said annular groove, said attaching portions being deflectable relative to said cap for resiliently restraining removal of said cap from said plastic member, said attaching portions presenting outer radius portions engageable with said bottom portion of said annular groove to retard relative rotation of said cap and said wheel, said annular groove being formed of segments with one segment extending between adjacent mounting holes of said wheel, a cam surface formed in said plastic member circumferentially adjacent to opposite ends of each of said segments of said groove and at the exterior thereof to engage and simultaneously deflect said attaching portions radially inwardly upon rotation of said grease cap relative to said wheel during attachment of said grease cap to said wheel.

3,998,495

LOCKING DASHBOARD CONTROL VALVE

John P. Maxwell, Chatham, N.J., and John M. Ury, Hazelwood, Mo., assignors to Wagner Electric Corporation, Parsippany, N.J.

Continuation of Ser. No. 520,559, Nov. 4, 1974. This application Sept. 29, 1975, Ser. No. 617,426
Int. Cl.² B60T 17/16
U.S. Cl. 303—89 **4 Claims**



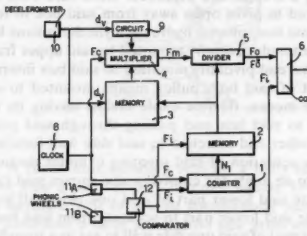
1. In a vehicle air brake system, the combination comprising a parking brake cylinder having a spring applied parking brake which is released by the introduction of air into the cylinder at a pressure greater than atmospheric pressure, a parking brake air reservoir, a push-pull control valve and locking means operative when actuated to secure said control valve in a predetermined position, said valve comprising: (a) a housing having a large bore therein; (b) a slidable closure member in said large bore, said locking means being disposed in said slidable closure member; (c) a valving rod eccentrically connected to said slidable closure member; and (d) a reduced bore extending eccentrically from said large bore, said valving rod being slidably engaged with said reduced bore.

3,998,496

METHOD AND APPARATUS FOR THE ANTISKID BRAKING OF A VEHICLE

PierLuigi Bernabo', Turin, and Oscar Blazic, Sant'Ambrogio (Turin), both of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed Sept. 9, 1975, Ser. No. 611,732
Claims priority, application Italy, Sept. 17, 1974, 69805/74
Int. Cl.² B60T 8/02, 8/08
U.S. Cl. 303—106 **2 Claims**



1. A method for the antiskid braking of a vehicle, by sensing the dynamic state of at least two wheels of at least one axle of the vehicle, of the type in which during a braking operation there are alternate "brake application" stages when the vehicle brakes are applied and "brakes released" stages when the vehicle brakes are released, commutation between these two stages being controlled in dependence on signals representing the speed of said at least two wheels of said at least one axle of the vehicle, and on a signal d_v representing the deceleration of said vehicle, wherein at the end of each brake application stage, the brakes of said two wheels of said axle are released when the slower wheel of the two exceeds a certain threshold of deceleration, and at the end of each "brakes released" stage the brakes are reapplied when the speed of the slower wheel of said axle reaches a certain threshold speed, this threshold speed being determined by a reference signal which has an initial value which is dependent on the speed of the slower wheel of this axle at the moment when the brakes are released, and which decreases linearly, with a slope proportional to the deceleration of the vehicle at the moment when the brakes are released, and wherein the method comprises performing, in successive cycles of operation of equal predetermined duration T, the steps of:

generaing a reference signal F_O dependent on the speed of the slowest wheel of the axle and on the deceleration of said vehicle, said reference signal being given by the relation:

$$F_O = \frac{1 - B - (A + Cd_v)\,T_1}{T_1}$$

where A, B and C are predetermined constants; d_v is the signal representative of the deceleration of said vehicle and T_1 is a signal representative of the speed of the slowest wheel of the axle at the initial moment of the cycle;

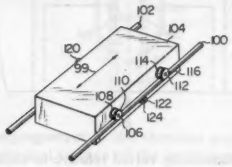
producing a signal F_I representing the instantaneous speed of the slower wheel of said axle;

comparing said reference signal F_O with said signal F_I representing the instantaneous speed of said slower wheel of said axle, and if the latter signal F_I becomes less than or equal to said reference signal F_O, stopping said cyclic processing and releasing the brakes of said two wheels of said axle to start the subsequent brakes released stage of operation.

3,998,497
GUIDE ROD APPARATUS

Yutaka Koizumi, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed July 8, 1975, Ser. No. 594,180
Claims priority, application Japan, July 11, 1974, 49-79541
Int. Cl.² F16C 19/00
U.S. Cl. 308—3 R 9 Claims

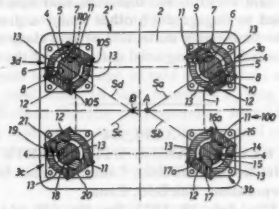


1. Apparatus for guiding a movable object, comprising:
first and second parallel guide rods;
first and second parallel shafts fixed to the object, the first shaft rotatably carrying first and second rollers straddling an upper surface of the first guide rod and rollingly riding thereon, the second shaft rotatably carrying third and fourth rollers straddling the upper surface of the first guide rod and rollingly riding thereon;
a third shaft fixed to the object and rotatably carrying a fifth roller, the fifth roller rollingly riding on an upper surface of the second guide rod; and
a fourth shaft fixed to the object and carrying a sixth roller which rollingly engages with a bottom surface of the first rod, the fourth shaft being disposed parallel to a plane passing through the first and second guide rods and perpendicular to the axes of the first and second guide rods.

3,998,498
APPARATUS FOR GUIDING A RAM WITHIN THE MACHINE FRAME OF A PUNCH PRESS OR THE LIKE

August Thomas Portmann, Arbon, Switzerland, assignor to Bruderer AG, Arbon, Switzerland

Filed July 25, 1975, Ser. No. 599,261
Claims priority, application Switzerland, Aug. 29, 1974, 11780/74
Int. Cl.² F16C 17/00
U.S. Cl. 308—3 A 20 Claims

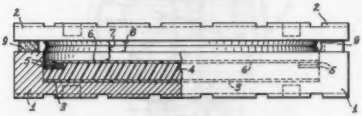


1. An apparatus for guiding a ram member in a machine frame member of a punch press, comprising four guides arranged in spaced relationship from one another in a substantially quadrilateral configuration, each of said guides being at least approximately arranged at a region of a corner of the quadrilateral configuration, a guide column provided for each guide, each guide column being provided with two guide surfaces arranged in a plane of travel of the workpiece to be processed by the punch press, said two guide surfaces of each guide column being situated opposite one another with respect to a diagonal direction of the quadrilateral defined by the guides, guide bodies which cooperate with said guide surfaces, said guide bodies being arranged either at the ram member or at the machine frame member.

3,998,499
STEEL BEARINGS WITH POLYCHLOROPRENE AND FLUOROCARBON RESIN

Romeo Chiarotto, Padova, Italy, assignor to Forniture Industriali Padova - S.p.A., Padova, Italy

Filed Dec. 18, 1975, Ser. No. 642,112
Int. Cl.² F16C 29/02
U.S. Cl. 308—3 R 20 Claims

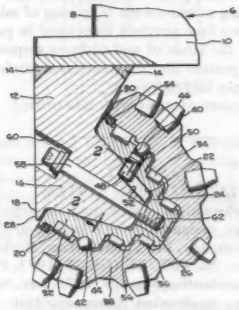


1. A bearing assembly comprising:
a. a base plate having a recessed seat therein,
b. a first sheet of fluorocarbon resin, having a low coefficient of sliding friction, positioned directly upon said base plate within said seat,
c. a layer of pressed polychloroprene lying directly upon said first fluorocarbon resin sheet and positioned within said seat,
d. a second sheet of fluorocarbon resin, having a low coefficient of sliding friction, in direct contact with the top surface of said layer and positioned within said sheet, and
e. a plate element having a lower portion extending within said seat, said lower portion positioned on said second sheet.

3,998,500
MOUNTABLE CONE SUB ASSEMBLY

Robert L. Dixon, Brea, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Aug. 28, 1975, Ser. No. 608,648
Int. Cl.² F16C 19/00
U.S. Cl. 308—8.2 7 Claims

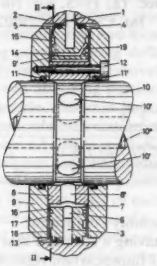


1. In a drilling tool, a body portion having a longitudinal axis,
a journal including a base carried by said body,
the journal extending downwardly and inwardly toward said longitudinal axis,
a sleeve-like bearing member on said journal,
means detachably securing said bearing member on said journal against axial displacement,
a cutter rotatably mounted on said sleeve-like bearing member,
and means interconnecting said cutter and said sleeve-like bearing member to secure the cutter against axial displacement from said bearing member.

3,998,501
SHAFT LOCATING ARRANGEMENT

Ivan Jaroslav Cyphelly, Forchstrasse 968, 8128-Hinteregg, Switzerland

Filed Feb. 17, 1976, Ser. No. 658,835
Int. Cl.² F16C *17/16*
U.S. Cl. 308—9 **10 Claims**



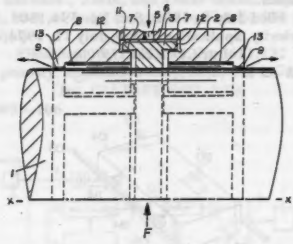
1. A shaft locating arrangement comprising:
a. a support member formed with a bore, said bore having an axis, and with a supply conduit having an orifice radially open toward said bore;
b. a shaft member rotatable in said bore about said axis;
c. first locating means radially interposed between said members in said bore and secured to one of said members,
1. said first locating means having two annular surfaces about said axis,
2. said surfaces being offset from said orifice in opposite axial directions,
3. each surface being formed with two grooves arcuate about said axis, said grooves being adjacent and remote from said orifice respectively and bounded by lands of said surface,
4. said first locating means including two ducts respectively connecting the two adjacent grooves to respective axially offset grooves remote from said orifice; and
d. second locating means on the other one of said members and having two face portions associated in parallel relationship with the lands of said surfaces respectively,
1. each face portion and the associated lands defining a throttling gap therebetween,
2. said gap communicating with said orifice.

3,998,502
FLUID BEARING SYSTEM

Lothar Walter, Schweinfurt, and Rainer Schurger, Arnstein, both of Germany, assignors to SKF Industrial Trading and Development Company, B.V., Amsterdam, Netherlands

Division of Ser. No. 409,704, Oct. 25, 1973, Pat. No. 3,934,947. This application May 19, 1975, Ser. No. 578,498
Claims priority, application Germany, Oct. 26, 1972, 2252495
Int. Cl.² F16C *32/06*
U.S. Cl. 308—9 **7 Claims**

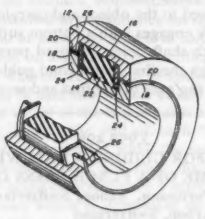
1. A fluid bearing for a shaft comprising an annular housing located about said shaft, said housing and said shaft defining at least one fluid compression pocket distributed about the periphery of said shaft, an inlet for the supply of fluid under pressure to said compression pocket and control means for regulating the flow of pressure to and form said pockets comprising an annular recess formed within said housing, an annular disk integral with said shaft and extending into said recess, said recess and said disk having conformingly longitudinally extending portions, the radially opposing surfaces of said longitudinal portions forming restrictor inlet openings, said housing having a radial surface opposing said shaft forming discharge openings, said restrictor inlet and discharge openings being simultaneously varied relative to each other in the opposite direction as a function of the size and distribution of the load thereon.



3,998,503
ELASTOMERIC BEARING

Jan W. Van Wyk, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sept. 23, 1974, Ser. No. 508,073
Int. Cl.² F16C *17/00*
U.S. Cl. 308—36 R **8 Claims**



1. A bearing for oscillatory service comprising relatively rotatable inner and outer concentric bearing members, a mass of elastomeric material disposed between said bearing members in non-sliding contact therewith, said bearing members having opposed cylindrical surfaces normally spaced apart radially by said elastomeric material, said spaced surfaces being adapted to engage each other under a predetermined radial load to limit radial deflection of said elastomeric material, and means for limiting axial deflection of the elastomeric material.

3,998,504
KEYED BEARING WITH INSERTS

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Filed Feb. 18, 1975, Ser. No. 550,444
Int. Cl.² F16C *9/06, 23/00*
U.S. Cl. 308—72 **10 Claims**

1. A spherical bearing comprising an outer member having a hole extending from side to side, at least two bearing inserts abutting the surface of the hole, the outer surface of said inserts being concave and spherical so that they provide constricted portions at each side of the outer member, the outer member also having a keyway extending axially from side to side; a key in the keyway substantially co-extensive with the keyway, the key also having a concave and spherical top surface corresponding to the inner bearing surface of the outer member of the hole so that the key has shoulder portions corresponding to the constricted portions of the outer mem-

ber; and a partially spherical inner member, the inner member being held in the outer member by impingement of the spherical surface of the inner member against the constricted portions of the outer member and the key being held in the outer

member by impingement of the shoulder portions of the key against the spherical surface of the inner member, the inserts being held in the outer member by the spherical surface of the inner member and by the key.

3,998,505

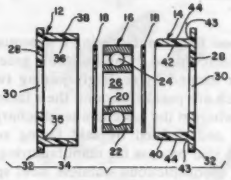
BEARING HOUSING ASSEMBLY AND METHOD THEREOF

Charles C. Frost, and Siegfried K. Weis, both of Grand Rapids, Mich., assignors to C. L. Frost & Son, Inc., Grand Rapids, Mich.

Continuation of Ser. No. 498,381, Aug. 19, 1974, Pat. No. 3,926,485, which is a division of Ser. No. 355,598, April 30, 1973, Pat. No. 3,844,010. This application Aug. 15, 1975, Ser. No. 605,168

Int. Cl.² F16C *33/60;* **B21D** *53/12*

U.S. Cl. 308—195 **13 Claims**



1. A bearing housing comprising: a pair of thermoplastic members, at least one of said members having a flat planar bottom wall portion and an annular outwardly extending side wall portion haaving a leading edge portion; said side wall portion having an inner wall surface thereon forming a cavity adapted to receive a bearing; an annular projection integrally formed on said leading edge of said wall surface surrounding said cavity; said other of said members having an annular projection formed thereon corresponding to said projection surrounding said cavity, said projection on said other of said members and said projection surrounding said cavity being fused to each other to form an integral housing about a bearing.

3,998,506

TOOTHED ROLLING CONTACT DEVICES

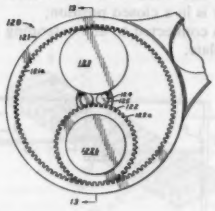
Earl W. Traut, P.O. Box 23776, Fort Lauderdale, Fla. 33307

Filed Jan. 30, 1974, Ser. No. 437,937

Int. Cl.² F16C *13/00, 33/00*

U.S. Cl. 308—205 **5 Claims**

1. A geared rolling contact crank mechanism comprising:
a ring-shaped bearing race,
first rotating means,
said first rotating means including two rotating rollers in rolling contact with the inner periphery of said bearing race,
second rotating means,
said second rotating means including two rollers in rolling contact with said first rotating means,
at least one retaining ring,
said retaining surrounding said two rollers of said second rotating means and serving to hold same in position against said first rotating means,



crank means,
shaft means,
said bearing race and one roller of said first rotating means having gear teeth affixed to at least one axial end of same,
so as to prevent sliding contact between said roller having gear teeth affixed to it and said bearing race.

3,998,507

CLUTCH RELEASE MECHANISM

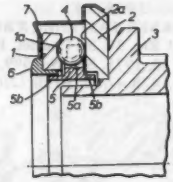
George Albert Tune, Ackworth, near Pontefract, England, assignor to Ransome Hoffmann Pollard Limited, England

Filed June 6, 1975, Ser. No. 584,527

Claims priority, application United Kingdom, June 7, 1974, 25379/74

Int. Cl.² F16C *19/00*

U.S. Cl. 308—233 **23 Claims**



1. A thrust bearing for the clutch release mechanism of a motor vehicle clutch, the bearing comprising a rotatable annular ring, a non-rotatable annular ring and a plurality of balls, said rings being axially spaced and capable of limited radial relative movement, wherein one of said rings has a planar raceway and said other ring has a grooved raceway.

3,998,508

GANG LOCKING MECHANISM

Douglas Scheerhorn, Grand Rapids, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.

Filed Oct. 2, 1975, Ser. No. 618,927

Int. Cl.² E05B *65/46*

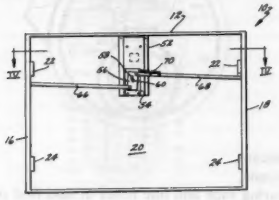
U.S. Cl. 312—221 **15 Claims**

1. In an article of furniture such as a desk, cabinet or the like having a rear wall and side walls, a plurality of vertically stacked slidable drawers, and a gang locking mechanism, said article and locking mechanism comprising:
one of said plurality of drawers being a master lock drawer having a front panel and bottom panel;
a master lock mounted in said master lock drawer behind said front panel thereof;
a single control rod mounted in said master lock drawer,

operably connected to said master lock and extending from said master lock in a rearward direction along said bottom panel of said master lock drawer;

a pivot plate pivotally mounted on the inner face of said rear wall of the cabinet, said pivot plate and said control rod including mating engaging means for selectively engaging and disengaging when said master lock drawer is closed and opened, respectively, whereby said pivot plate is operatively associated with said control rod when said lock drawer is in a closed position;

linkage means connected to and extending outwardly from said pivot plate;



locking means supported in said cabinet for limited movement between a locking position and an unlocking position, said locking means being operatively connected to said linkage member;

said locking means being adjacent said plurality of drawers, each of said drawers and said locking means comprising interengaging blocking means which disengage when said locking means is in said unlocking position and which engage when said locking means is in said locking position for blocking the movement of said drawers whereby each of said plurality of drawers is locked in a closed position upon turning of said master lock.

3,998,509

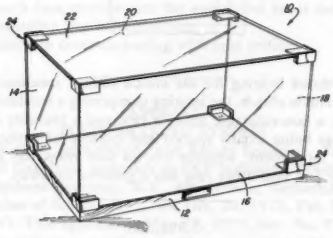
CASE AND CORNER FASTENER THEREFOR

Jon W. Hauser, 3N981 Rte. 31, St. Charles, Ill. 60174

Filed July 28, 1975, Ser. No. 599,529

Int. Cl.² A47B *47/00*; F16B *12/00*

U.S. Cl. 312—263 **9 Claims**



1. A corner clip for interconnecting the adjoining corner portions of a plurality of orthogonally disposed panels forming a six sided enclosure, said clip comprising a one piece member having

a horizontally disposed ledge with horizontal top and bottom planar surfaces and one pair of mutually orthogonal side edges,

a pair of upright side walls joined together at one vertical edge and disposed in mutual perpendicular relationship,

the inner surface of each of said side walls being planar and vertical,

said side walls having top and bottom terminal edges located exteriorly of the respective planes of said inner surfaces of said side walls,

said side walls respectively joining said side edges of said ledge at locations intermediate said top and bottom edges of said side walls, and

first and second vertical flanges extending from one surface only of said ledge in spaced parallel relationship with respective ones of said side walls,

whereby two of said three panels may be respectively disposed between said flanges and said walls and the corner portion of the other of said three panels may lie against the other side of said ledge with the edges thereof abutting said side panels.

3,998,510

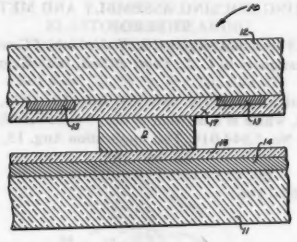
METHOD OF USING INVISIBLE SPACERS FOR ELECTRO-OPTICAL DISPLAY DEVICE MANUFACTURE

Charles W. Salisbury, Risingsun, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Dec. 23, 1974, Ser. No. 535,247

Int. Cl.² H01J *9/40*

U.S. Cl. 316—17 **6 Claims**



1. In a process for manufacturing a gaseous discharge display device characterized by an ionizable gaseous medium in a gas chamber formed by sealingly joining two planar glass substrates which are parallel around their facing surfaces, the improvement wherein the gas chamber discharge gap between the substrates and defined by said facing surfaces is kept uniform during said process for manufacturing and thereafter by positioning inconspicuous stainless steel spacer members therebetween on one of said glass substrates, said discs having a Brinell hardness number of from about 150 to 240, and thereafter sealing said substrates with a sealing glass composition by the application of heat and pressure sufficient to melt the sealing glass and firmly imbed the discs in the opposing substrate surfaces between firing sites.

3,998,511

FULL-CIRCLE CONTACT ELECTRICAL SLIP-RING BRUSH

Harry T. Jensen, Milford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 9, 1975, Ser. No. 566,556

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H01R *39/00*

U.S. Cl. 339—5 M **2 Claims**

1. A rotary electrical connection comprising:

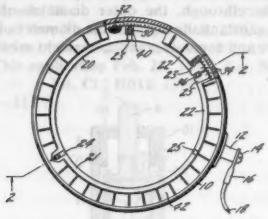
an annular frame member;

a plurality of circular segment, self-lubricating, electrically conductive brush members loosely restrained within said annular frame member to provide substantially a full circle of electrical contact surface;

means resiliently urging said brush members into contact with said frame member;

means resiliently urging said brush members radially inward, thereby to ensure contact with a rotating member when disposed within said frame member; and

means providing for connection of an electrical conductor to said frame member.

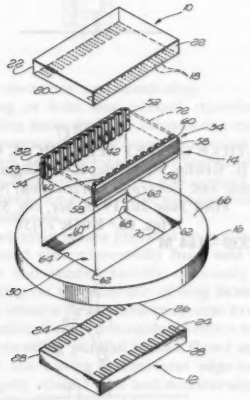


3,998,512

ELECTRICAL CONNECTOR

John W. Anhalt, Orange; David S. Goodman, Mission Viejo, and Ocsar Alonso, Westminister, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 549,774, Dec. 13, 1975, abandoned. This application Apr. 7, 1976, Ser. No. 674,501
Int. Cl.[2] H05K *1/00*
U.S. Cl. 339—17 CF 6 Claims



1. An electrical connector member for interconnecting a first electronic component having a first row of spaced conductive traces on the lower surface thereof with a second electronic component having a second row of spaced conductive traces on the upper surface thereof aligned with said first row of conductive traces comprising:

an electrically nonconductive resilient elastomeric member having front and rear generally flat vertically extending faces thereon, said member being compressible in a vertical direction;

said member having upper and lower edges;

a row of vertically extending spaced electrically conductive resilient elastomeric strips adhered to only said front face and extending from said upper edge to said lower edge, the spacing of said strips corresponding to the spacing of said traces on said electronic components, said upper and lower edges and said rear face being devoid of any conductive material thereon;

said upper and lower edges being generally flat and parallel to each other; and

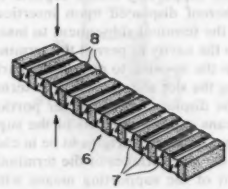
the upper and lower ends of said strips being coplanar with said upper and lower edges, respectively.

3,998,513

MULTI-CONTACT INTERCONNECTORS

Gensuke Kobayashi, Omiya, and Akio Nakamura, Kawaguchi, both of Japan, assignors to Shinetsu Polymer Co., Ltd, Tokyo, Japan

Filed Jan. 28, 1976, Ser. No. 653,125
Claims priority, application Japan, Jan. 31, 1975, 50-13166
Int. Cl.[2] H01R *13/40*
U.S. Cl. 339—59 M 9 Claims



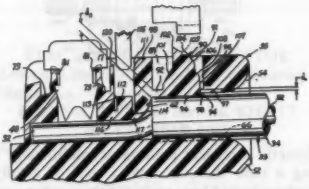
1. A multi-contact interconnector for connecting electric terminal points comprising a plurality of layers of an electrically conductive material and a plurality of layers of an electrically insulating and heat-shrinkable material, at least the electrically conductive material having rubber-like elasticity, the layers of one material and the other material alternately lying one upon another, each electrically insulating and heat-shrinkable layer having a recessed periphery against the flat perphery of each electrically conductive layer.

3,998,514

DEVICE ARMED WITH A TERMINAL FOR MAKING ELECTRICAL CONNECTION WITH A CONDUCTOR

Edwin Charles Hardesty, Perry Hall, Md., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,629
Int. Cl.[2] H01R *13/40*
U.S. Cl. 339—99 R 16 Claims



1. A device armed with a terminal for making an electrical connection with a conductor and for engaging electrically a component external to the device, which comprises:

a dielectric housing which includes a conductor-receiving cavity and a terminal-receiving opening which communicates with the cavity, the terminal-receiving opening including a slot overlying and extending generally parallel to the cavity, the length of the slot being exposed to an exterior surface of the device;

an electrically conductive blade-like terminal seated partially within the terminal-received opening and having essentially flat parallel side surfaces spaced apart by end surfaces and which includes an internal contact portion that extends into the cavity when the terminal is fully seated within the housing to pierce the insulation of and make electrical engagement with a conductor inserted into the cavity and an external contact portion for engaging electrically a component external to the connector, the terminal having barbs formed on end surfaces thereof; and

means formed integrally with the housing between the slot

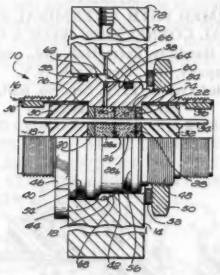
and the exterior surface of the housing and further defining the terminal-receiving opening for supporting the terminal within the opening in a partially seated position to space the internal contact portion above the cavity with the barbs being embedded in portions of the housing which define the terminal-receiving opening and with portions of the side surfaces of the terminals adjacent the end surfaces extending through and being held in clamped engagement by portions of the supporting means to prevent unintended linear and pivotal movement of the terminal, the supporting means capable of having other portions thereof displaced upon insertion forces being applied to the terminal subsequent to insertion of a conductor into the cavity to permit the terminal to be moved further into the opening to embed the barbs in the material defining the slot and seat fully the terminal within the housing, the displacement of other portions of the supporting means causing portions of the supporting means adjacent the displaced portions to be in clamping engagement with the side surfaces of the terminal, the clamping engagement of the supporting means with the terminal and the embedding of the barbs in the material defining the slot cooperating to stabilize the terminal and prevent unintended movements thereof.

3,998,515

HERMETIC ELECTRICAL PENETRATOR

George J. Panek, Phoenix, Ariz., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,619
Int. Cl.² H01R 3/04
U.S. Cl. 339—117 P 3 Claims



1. A hermetic electrical penetrator comprising: a hollow shell having a bore therethrough; a pair of axially spaced sealing members in said bore sealed at their outer periphery to the wall of said bore, said spaced sealing members defining a leak sensing chamber therebetween; at least one electrical contact extending lengthwise through said sealing members, said contact being sealed in said sealing members; and a leak sensing port in said shell extending from said chamber to the exterior of said shell, said shell embodying relatively smaller and larger diameter outer cylindrical surfaces joined by a generally annular shoulder; and said port opening at said smaller diameter outer surface of said shell.

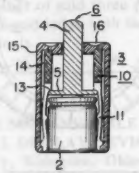
3,998,516

ADAPTER

Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed May 6, 1974, Ser. No. 467,305
Claims priority, application Japan, May 15, 1973, 48-53839; June 11, 1973, 48-69015; June 11, 1973, 48-69016
Int. Cl.² H01R 13/02
U.S. Cl. 339—153 6 Claims

1. An adapter to enable a non-standard size battery to be operatively placed into a battery compartment designed to house a standard size battery which is larger in diameter than said non-standard size battery; wherein said adapter comprises an outer tubular body having an end plate with a hole formed coaxially therethrough, the outer diameter of said tubular body being substantially equal to the diameter of the standard size battery, and separate, tubular resilient means removably



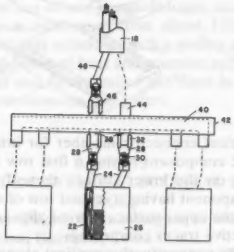
disposed within said outer tubular body, the inner diameter of said tubular resilient means being slightly smaller than the diameter of said non-standard size battery , the maximum diameter and length of the combination of said non-standard size battery and said adapter are equal to the maximum diameter and length of the standard battery so that said non-standard size battery and said adapter can be operatively housed in the battery compartment.

3,998,517

MULTIPLE OUTLET ELECTRICAL CONNECTOR

Richard H. Griffin, Riverside, R.I., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 20, 1975, Ser. No. 588,758
Int. Cl.² H01R 13/50
U.S. Cl. 339—164 M 4 Claims

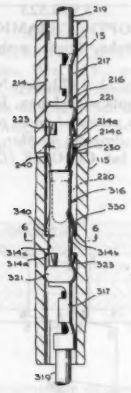


1. An electrical connector having a multiple wire electrical supply line interconnected to a plurality of electrical outlets each having the same plurality of wires associated therewith including a plurality of flat conductive strips, each strip having a plurality of connecting tabs extending from one edge thereof for connecting each of said outlet wires thereto and one connecting tab extending from the opposite edge thereof for connecting a corresponding wire of said supply line, insulating means having a plurality of slots therethrough for positioning said strips in a spaced insulated relationship, and terminals on each of said wires connected to said connecting tabs whereby each of the wires of said supply line is connected to one of said connecting tabs extending from said opposite edge of each of said strips and each of said connecting tabs on said one side is connected to a wire associated with each of said outlets.

3,998,518
ELECTRICAL CONNECTOR HAVING IMPROVED RELEASABLE CONTACT CONSTRUCTION

Istvan Mathe, Cicero, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 414,046, Nov. 8, 1973, abandoned, which is a division of Ser. No. 241,014, April 4, 1972, Pat. No. 3,790,923. This application Feb. 28, 1975, Ser. No. 553,999
Int. Cl.² H01R 13/42
U.S. Cl. 339—217 S 10 Claims



1. An electrical connector part comprising:

a housing having at least one contact receiving cavity therein providing inner surfaces of insulating material,

a first electrical contact defined by an annular wall having a longitudinal axis and an elongate slot therein extending parallel to the longitudinal axis of said contact and disposed in said cavity for engagement with another contact moved along said axis,

first releasable retention means provided on said contact at a position spaced circumferentially from said slot and having a free end spaced radially outwardly of said contact operating on the principle of long beam deflection by flexure about a flexure axis transverse to said slot,

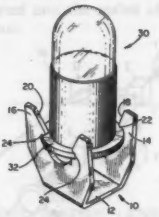
radially compressible second releasable retention means on said contact extending parallel to and flared outwardly from said slot and having a transverse edge extending radially outwardly of said wall and transversely to said wall, and

shoulder means and a radial face provided in said cavity, said shoulder means engaging said first retention means for flexing the free end thereof inwardly toward said longitudinal axis of said contact and engaging and radially compressing said second retention means to permit insertion of said first contact and each retention means in one direction past said shoulder means, whereafter the free end flexes outwardly to engage a surface of said cavity to bias said first contact transversely to the longitudinal axis of said first contact and the compressed second retention means relaxes to align said transverse edge to engage said radial face, said free end and said transverse edge engaging said radial face to thereafter retain said first contact in said cavity in response to a force created by engagement of said other contact with said first contact tending to move said first contact in a direction opposite said one direction, said first retention means thereafter flexibly operable at a position spaced from said free end and said second retention means compressibly operable to enable the displacement of said transverse edge from alignment with said radial face and movement of said first contact in said opposite direction from said cavity.

3,998,519
LAMP SUPPORT

Wilbert A. Martin, Arvada, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 2, 1973, Ser. No. 375,939
Int. Cl.² H01C 1/02
U.S. Cl. 339—258 R 6 Claims



1. A support for a flange base electrical lamp comprising:

a. a pair of substantially parallel, spaced, facing and coextending members;

b. said members each having a corresponding extremity affixed to a base portion and at least one of said members biased so as to allow limited pivotal movement thereof against said bias and away from the other member;

c. the extremity opposite the fixed extremity of said members each including an opening which together accommodate and hold the flange of a flange base lamp;

d. at least one of said openings being substantially "V"-shape in form and including a pair of oppositely disposed notches;

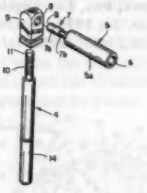
e. said members spaced to allow said limited pivotal movement against said bias upon insertion of the flange of a flange base lamp into said openings and until accepted by said notches;

f. said members also spaced to allow said limited pivotal movement against said bias upon removal of the flange of a flange base lamp from said openings brought about by the flange being moved and forced out of said notches.

3,998,520
ELECTRIC ELBOW CONNECTOR

Carl G. Zemels, Lilburn, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.

Filed Nov. 13, 1975, Ser. No. 631,717
Int. Cl.² H01R 3/02
U.S. Cl. 339—276 T 12 Claims

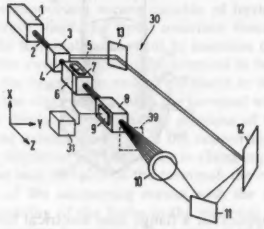


1. An electric elbow connector comprising an elongated contact sleeve having a hollow sleeve portion at one end and an integral shank at the other end, said shank having an outer end portion and an inner portion, said inner portion of said shank being of a substantially smaller transverse dimension than said outer portion whereby said inner portion of said shank is rendered more readily deformable than said outer end portion, an electric conductor having an end portion disposed within said sleeve portion of said contact sleeve and secured therein, and a contact pin in electric contact with said outer end portion of said shank.

3,998,521
LINEAR DATA INPUT TRANSDUCER

Hans Eschler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 15, 1975, Ser. No. 640,785
Claims priority, application Germany, Dec. 19, 1974, 2460218
Int. Cl.² G07B 27/00
U.S. Cl. 350—3.5 **10 Claims**

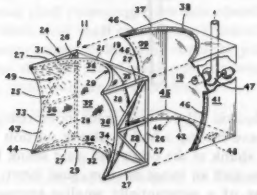


1. A linear data input transducer for use in a system for holographically recording data, said system comprising a laser providing a laser beam, beam divider means for splitting the laser beam into an object beam and a reference beam, a linear data input transducer disposed in the path of the object beam for spatially modulating the object beam with items of information to be recorded, and a hologram storage medium on which the reference beam and the modulated object beam are directed to record the data in holographic form, said linear data input transducer comprising a first means for acousto-optical deflecting the object beam into a plurality of beams extending in a first direction; second means for acousto-optical deflecting object beams into a plurality of beams extending in a second direction, each of said first and second means having means creating sound waves with the sound waves of the first means extending at right angles to the sound wave of the second means so that the first direction is at a right angle to the second direction; and means for applying a signal input to both of the means for creating the sound waves, said means for applying including a chain of high frequency oscillators, which are independently actuated, and an adder circuit for combining the output of the oscillators into a signal input.

3,998,522
SCREEN FOR EXHIBITING PROJECTED IMAGES

Thomas M. Holzel, New York, N.Y., assignor to Intercontinental Satellite Network, Inc., Los Angeles, Calif.

Filed Mar. 24, 1975, Ser. No. 561,073
Int. Cl.² G03B 21/60; G02B 5/10; G03B 21/58
U.S. Cl. 350—125 **4 Claims**

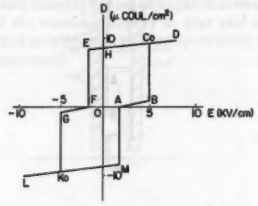


1. A screen for exhibiting projected images and comprising:
a boxlike frame having a front and a back with a substantially rectangular rim about the front,
a membrane covering the front and having a margin extending to the vicinity of the rim,
a cover enclosing the back of the frame and connected in sealed engagement to the margin of the membrane at the rim so as to define a plenum,
exhaust means for withdrawing gas from the plenum whereby the membrane forms a concave image receiving surface curved in a relatively constant degree about a single point so that the image receiving surface takes on a spherical shape,
means for varying the withhdrawing of the gas from the plenum whereby said degree of curvature is variable.

3,998,523
ELECTRO-OPTIC CERAMIC MATERIAL

Yoshiro Otomo, Mitaka, Japan, assignor to Hitachi, Ltd., Japan

Filed July 31, 1973, Ser. No. 384,225
Claims priority, application Japan, July 31, 1972, 47-75916
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² G02F 1/26
U.S. Cl. 350—150 **30 Claims**

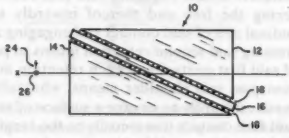


1. A longitudinal electro-optic ceramic material comprising a solid solution in which two phases coexist with one another with a morphotropic phase boundary therebetween, one of said phases being selected from the group consisting of an anti-ferroelectric phase and a para-electric phase, the other of said phases being a ferroelectric phase.

3,998,524
BIREFRINGENT POLARIZATION PRISM WITH A LARGE ANGULAR APERTURE

Laurence Meade Hubby, Jr., San Francisco, and James Harrison Boyden, Los Altos Hills, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 20, 1975, Ser. No. 606,625
Int. Cl.² G02B 27/28, 5/30
U.S. Cl. 350—157 **9 Claims**



1. A polarization prism for polarizing incident light, said prism comprising:
a pair of prism substrates each of a first relatively strain-free material with a plurality of indices of refraction;
an intermediate layer of a second relatively strain-free material with a plurality of indices of refraction, said intermediate layer being disposed between and spaced apart from the pair of prism substrates; and
an index matching medium disposed between the intermediate layer and each of the pair of prism substrates for providing optical coupling therebetween;

said first and second relatively strain-free materials, and said index matching medium each being selected to substantially match the lesser index of refraction curve of the first relatively strain-free material with the greater index of refraction curve of the second relatively strain-free material and the index of refraction curve of the index matching medium, said prism substrates and intermediate layer having the respective optic axes of the two materials aligned for providing a transmission path with a substantially constant index of refraction therealong to a selected polarization component of the incident light.

3,998,525

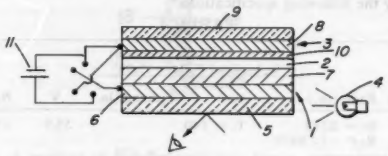
EDGE LIGHTED ELECTROCHROMIC DISPLAYS

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 409,829, Oct. 26, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,691

Int. Cl.² G02F 1/28

U.S. Cl. 350—160 R **8 Claims**



1. A variable light transmission device which comprises:
a light transmitting substrate having a persistent electrochromic material as a light modulating material,
a counter-electrode, and
a layer of an ion-conducting material in contact with said electrochromic material and said counter-electrode, and
illumination means to provide background illumination diffusing through the interior of said device to illuminate the imaging area to provide contrast for said electrochromic material in the absence of ambient light.

3,998,526

LIQUID CRYSTAL DISPLAY DEVICE

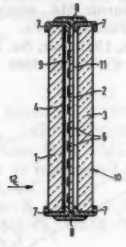
Helmut Katz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 2, 1975, Ser. No. 592,522

Claims priority, application Germany, July 30, 1974, 2436658

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **8 Claims**



1. In a liquid crystal display screen having at least one liquid crystal cell and operating in a reflective mode, said screen having an outer transparent wall component coacting with a transparent thin wall component extending parallel and in spaced relationship thereto to form a chamber for a liquid crystal layer, said wall components having surfaces facing said layer provided with transparent electrically conductive coatings with at least one coating being in an electrode pattern, and means for reflecting light disposed on a surface of the thin wall component facing away from the liquid crystal layer, the improvement comprising said thin wall component coacting with a second outer wall component to form a sealed chamber, and said means for reflecting comprising a partially to completely reflecting medium disposed in the sealed chamber, said medium being inserted into the sealed chamber while in the gaseous or liquid state.

3,998,527

WIDE-ANGLE PHOTOGRAPHIC LENS SYSTEM WITH A SHORT OVERALL LENGTH

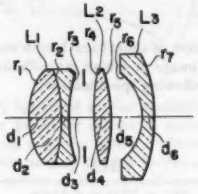
Yoshitsugi Ikeda, Hachiouji, and Yoshio Nishimoto, Hamura, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 13, 1975, Ser. No. 577,016

Claims priority, application Japan, May 14, 1974, 49-52836

Int. Cl.² G02B 9/12, 13/18

U.S. Cl. 350—189 **7 Claims**



1. A wide-angle photographic lens system with a short overall length comprising a first, second and third lens components, said first lens component being a cemented doublet lens consisting of a positive lens and negative lens, said second lens component being a positive lens, and said third lens component being a negative meniscus lens, said wide-angle photographic lens system with a short overall length satisfying the following conditions (1) through (4), the surface r_6 on the object side of said third lens component being formed as an aspherical surface expressed by the following formulas (5) when the direction of the optical axis is represented by x axis and the direction perpendicular to the optical axis is represented by y axis:

(1) $$1.2f < f_1 < 1.8f$$

(2) $$0.16 < n_2 - n_1 < 0.22$$

(3) $$1.8 < -r_4/r_5 < 2.3$$

(4) $$0.4f < -f_3 < 0.8f$$

(5) $$x = \frac{y^2}{r_6 + r_6\sqrt{1-\left(\frac{y}{r_6}\right)^2}} + Ey^4 + Fy^6 + Gy^8 + Hy^{10}$$

$$E > 0,\ F < 0,\ G > 0$$

wherein reference symbol f represents the focal length of the lens system as a whole, reference symbol f_1 represents the focal length of said first lens component, reference symbol f_3 represents the focal length of said third lens component, reference symbols n_1 and n_2 respectively represent refractive indices of said positive and negative lenses of said first lens component, and reference symbols r_4 and r_5 respectively represent radii of curvature of the front and rear surfaces of said second lens component.

3,998,528

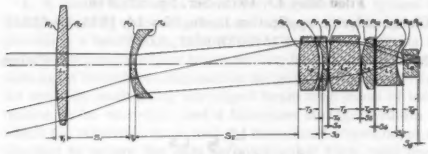
7MM ULTRAFICHE LENS

Andor A. Fleischman, Northbrook, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sept. 29, 1975, Ser. No. 617,773

Int. Cl.² G02B 9/64

U.S. Cl. 350—176 **1 Claim**



1. An optical system of short focal length and large aperture for magnifying an image at a high magnification ratio having substantially the following specification:

TABLE 1

Lens	Radii(In.)	Thickness	Spacing	V	N_D
	EFL = .2719 in./6.91mm ½ Angle of Field = 12.88°				
L_1	R_1=4.5830 R_2=11.8800	T_1=.0900	S_1=.5040	25.7	1.785
L_2	R_3=.7520 R_4=-.3510	T_2=.0500	S_2=1.3570	54.7	1.691
L_3	R_5=2.6748 R_6=.5280	T_3=.1600	S_3=.0279	51.7	1.734
L_4	R_7=-.4620 R_8=1.5590	T_4=.0400	S_4=.0050	25.4	1.805
L_5	R_9=.7135 R_{10}=1.4020	T_5=.2710	S_5=.0050	51.7	1.734
L_6	R_{11}=.3780 R_{12}=-3.3579	T_6=.1000	S_6=.0020	51.7	1.734
L_7	R_{13}=7.7020 R_{14}=-.2900	T_7=.1870	S_7=.0540 (.1803=BFL)	25.4	1.805
L_8	R_{15}=Inf R_{16}=Inf	T_8=.1240	O-S_8=.563	Optical Material	

wherein the first column lists the lens elements starting at the ray exit side of the system; the second column lists the respective radii R_1 – R_{16} for the surfaces of the elements; the third column lists the thickness T_1 to T_8 of the respective elements; the fourth column lists the axial spacings S_1 to S_8 between the respective elements and the image plane; and the fifth and sixth column list respectively the dispersive index V and the refractive index "N_D" of the elements.

3,998,529

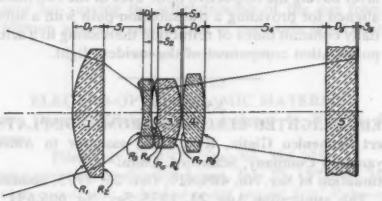
MICROFILM RECORDER LENS

Andor A. Fleischman, Northbrook, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Aug. 13, 1975, Ser. No. 604,370

Int. Cl.² G02B 11/30

U.S. Cl. 350—216 **1 Claim**



1. An economically manufacturable optical system of relatively large effective aperture for imaging an object at a significant reduction onto a film plane the system having substantially the following specifications:

TABLE 1

Lens	Radii (In.)	Thickness (In.)	Spacing (In.)	V	N_D
	EFL = .8118 in (20.66mm) ½ Angle of Field = 15.95°				
L_1	R_1 = .5249 R_2 = – 13.8820	T_1 = .140	S_1 = .178	55.9	1.651
L_2	R_3 = – .4295 R_4 = + .5765	T_2 = .039	S_2 = .178	27.6	1.755
L_3	R_5 = – .4185 R_6 = – .3400	T_3 = .109	S_3 = .005	54.7	1.691
L_4	R_7 = .7135 R_8 = –.7135	T_4 = .101		54.7	1.691
L_5	R_9 = Inf. R_{10}= Inf.	T_5 = .125	BFL = .697 inches to film plane		

wherein the first column lists the lens elements numerically starting at the ray entrance side of the system; the second column lists the respective radii R_1 to R_{10} of the elements; the third column lists the thicknesses of the respective element; the fourth column lists the axial spacings S_1 – S_5 between the respective elements; and the fifth and sixth column lists respectively the refractive index and the dispersive index of the optical material.

3,998,530

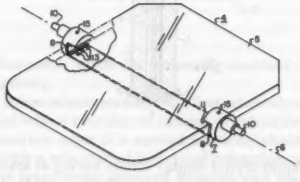
ANGULARLY MOVABLE MIRROR ASSEMBLY

Michael Kaschak, Glen Burnie, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 28, 1975, Ser. No. 599,491

Int. Cl.² G02B 5/08

U.S. Cl. 350—310 **3 Claims**



1. An improved angularly movable mirror assembly for airborne use, comprising,

a planar mirror having a reflector surface,

a relatively narrow elongated rigid support member extending across the back of said mirror midway between its opposite ends,

said rigid support member being adapted for turning movement about a rotary axis extending along its length and in the plane of said reflector surface, and

formed-in-place resilient members of elastomeric material interposed between said rigid support member and said mirror, as a support and motion-coupling intermediary.

3,998,531

METHOD OF MAKING PROTECTIVE OPTICAL COMPONENTS

Marzouk Y. Marzouk, 503 S. Fifth St., San Jose, Calif. 95112

Continuation-in-part of Ser. No. 520,772, Nov. 4, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 625,916

Int. Cl.² G02C *7/06, 7/02*

U.S. Cl. 351—166 **13 Claims**

1. A method of making opthalmic lenses, comprising the steps of:

selecting a transparent plastic material having an index of refraction exceeding that of crown glass and being above about 1.65 forming at least the major body portion of a first lens body from said transparent plastic resinous material having an index of refraction greater than that of crown glass;

selecting first and second thin glass shields, one of said shields having the shape and radius for defining one side of a finished lens and the other of said shields having the shape and radius for defining the other side of said finished lens;

shaping said first lens portion to provide the desired optical power; and,

simultaneously therewith bonding each of said glass shields to its correspondingly shaped surfaces of said first lens portion.

9. An opthalmic lens comprising:

a first central body portion made of a transparent plastic resin having an index of refraction greater than that of crown glass and being above about 1.65 and shaped to define a lens having a first predetermined power; and,

a plano shield of tempered glass having a thickness of approximately one millimeter secured to and covering each face of said lens.

3,998,532

WIDE ANGLE SINGLE CHANNEL PROJECTION APPARATUS

Wiley V. Dykes, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 8, 1974, Ser. No. 459,143

Int. Cl.² G03B *37/00*

U.S. Cl. 352—69 **3 Claims**

1. In apparatus for producing panoramic scenes up to 360° wide, comprising in combination:

a concave-mirror collector-reflector having an opening through the wall thereof at the apex thereof;

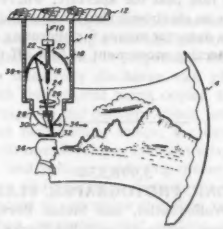
an elongated arc lamp extending through the opening in the wall at the apex of said concave mirror reflector-collector in such manner as to position the light emitting source portion thereof at the focal point of said concave mirror reflector-collector;

a condensing lens spatially disposed from said elongated arc lamp and said convex mirror collector-reflector in such manner that light rays from said arc lamp are reflected and directed by said mirror collector-reflector therethrough to a predetermined point of conversion;

a convex projector mirror spatially disposed from the side of the aforesaid condensing lens that is opposite said convex mirror collector-reflector and centrally apertured in such manner that the aperture thereof forms an exit pupil therethrough that coincides with the aforesaid point of conversion;

a concave mirror contoured to receive said light rays through the exit pupil of said convex projector mirror and spatially disposed therefrom in such manner as to reflect said light rays back to the convex mirror portion thereof, so as to be projected thereby;

means for positioning a film to be projected in the light ray path between said condensing lens and the exit pupil of said convex projector mirror;



a substantially spherical screen spatially disposed around said convex projector mirror in such manner that the center thereof concides with the aforesaid exit pupil and that the inside surface thereof receives rays projected by the convex mirror surface of said convex projector mirror;

support means effectively connected to said concave miror collector-reflector, said elongated arc lamp, said condensing lens, said convex projector mirror, said concave mirror, and said film positioning means for effecting the mounting thereof within said substantially spherical screen in such manner as to position the aforesaid exit pupil of said convex projector mirror at a position that is substantially coincident with the center of said substantially spherical screen; and

means disposed within said substantially spherical screen for seating a human viewer therein in such manner that the eyes thereof are in a close proximity with the aforesaid exit pupil as desired and for placing the head thereof in the shadow zone of the aforesaid concave mirror.

3,998,533

VIDEO FILM PROJECTOR

Earl Chamberlin, 1804 Mission, Santa Cruz, Calif. 95060

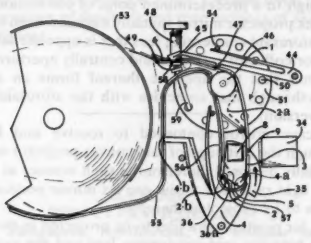
Filed Jan. 31, 1973, Ser. No. 328,244

Int. Cl.² G03B *1/00*

U.S. Cl. 352—184 **6 Claims**

1. A film projector comprising a gate, means forming an aperture in the gate, means forming a light path through the aperture and through film disposed in the gate, drive means for driving film through the gate and transporting film past the aperture, registration pin means for engaging perforations in the film driven through the gate to intermittently hold the film motionless with respect to the aperture, the drive means and registration pin means together providing intervals during which the film is transported past the aperture alternating with intervals during which the film is held motionless with respect

to the aperture, shutter means for interdicting the light path, means for driving the shutter means independently of the speed of transport of the film past the apertue and independently of the length of the interval during which the film is held motionless with respect to the aperture, and synchroniz-



ing means for positively synchronizing the shutter means with transport of the film past the aperture, wherein said shutter means comprises an electronic shutter and said synchronizing means comprises detector means for operating said electronic shutter upon detecting movement of film off the registration pin.

3,998,534

ELECTRONIC PHOTOGRAPHIC FLASH UNIT

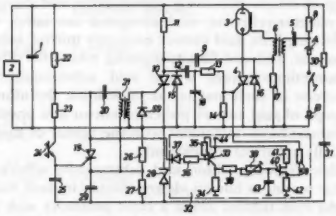
Axel Schulze, Wolfenbuttel, and Stefan Borejko, Broitzem, both of Germany, assignors to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Apr. 1, 1975, Ser. No. 564,160

Claims priority, application Germany, Apr. 9, 1974, 2417242

Int. Cl.² G03B *21/00*

U.S. Cl. 352—200 **12 Claims**



1. An electronic photographic flash unit with automatic exposure control, comprising

a. a flash tube,

b. current supply means for supplying current to said flash tube,

c. a first thyristor serving as a switching thyristor and connected in series with said flash tube,

d. a quenching capacitor,

e. means including a resistor in series with said quenching capacitor for charging said quenching capacitor,

f. a second thyristor serving as a quenching thyristor and connected in series with said quenching capacitor in a circuit in parallel with said first thyristor,

g. circuit means for rendering said first thyristor non-conductive in response to a discharge current from said quenching capacitor, and

h. means for producing forced commutation of said second thyristor after said first thyristor has been rendered non-conductive.

3,998,535

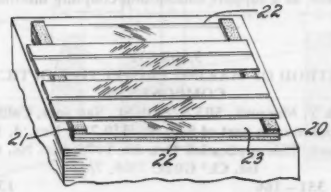
RESILIENT FRAME CONSTRUCTION FOR DISPLAYING TRANSPARENCIES

Jim Clarke, 148-150 Madison Ave., New York, N.Y. 10016

Filed July 31, 1975, Ser. No. 600,799

Int. Cl.² G03B *21/14, 1/44*

U.S. Cl. 353—84 **3 Claims**



1. An improved frame construction for use in supporting transparencies in position for projection by an overhead optical projector comprising: a relatively rigid rectangular transparent sheet of material bounded by a pair of shorter edges, a pair of longer edges, and first and second parallel surfaces; a first pair of resiliently flexible planar strips of substantial thickness secured to said first surface of said sheet, each strip abutting one of said longer edges of said sheet at one edge of said strip and having a second parallel edge facing the corresponding edge of the other strip to define a channel for the selective engagement and frictional retention of a display sheet; a second pair of resilient flexible planar strips of substantial thickness secured to said second surface of said sheet, each strip abutting one of said shorter edges of said sheet along one edge of said strip, and having a second parallel edge facing the corresponding edge of the other of said second pair of strips to define a second channel for the selective engagement of said display sheet, the axis of said first and second channels being mutually perpendicular.

3,998,536

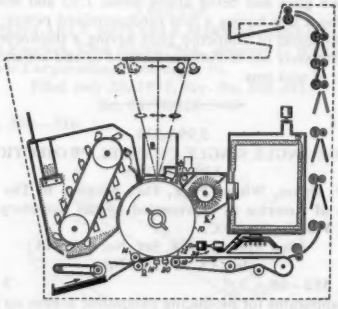
APPARATUS FOR ELECTROSTATIC PAPER STRIPPING

Norbett H. Kaupp, Newark, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 41,668, May 20, 1970, abandoned, which is a continuation of Ser. No. 585,816, Oct. 11, 1966, abandoned. This application Nov. 18, 1971, Ser. No. 200,253

Int. Cl.² G03B *15/22*

U.S. Cl. 355—3 R **8 Claims**



1. Electrophotographic copying arrangement comprising, in combination, transporting means having a movable surface; means for forming on said surface a latent image; developing means for applying a powder to said latent image to form a powder image on said surface; means for feeding a chargeable

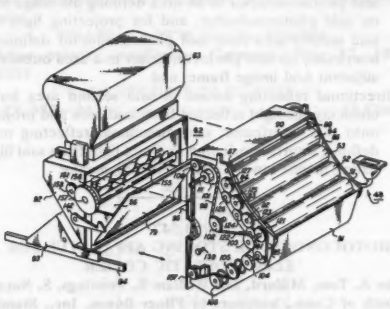
copy carrier to said surface in the region of said powder image; a transfer charging device emitting a first ion stream toward said copy carrier for charging said copy carrier with a first charge having a first polarity so that said powder image is transferred to said charged copy carrier and an electrostatic force attracts said charged copy carrier to said surface; and a compensating charging device emitting a second ion stream toward said copy carrier for charging said charged copy carrier during passage of said compensating charging device by said copy carrier with a second charge having a second polarity opposite to said first polarity and being substantially equal to said first charge produced by said first ion stream during passage of said transfer charging device by said copy carrier for at least substantially neutralizing said first charge so that said copy carrier does not adhere to said surface of said transporting means.

3,998,537

SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE AND CATCH

Richard E. Smith, Webster, and John E. Forward, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 20, 1974, Ser. No. 525,530
Int. Cl.² G03G 15/09
U.S. Cl. 355—3 DD 10 Claims



1. A magnetic brush development system for developing latent electrostatic images carried by a substrate, said system comprising:

a movable section including a sump for storing a supply of developer, means for defining a discharge orifice from said sump through which developer tends to flow;

a stationary section including at least one development roll for applying developer to said substrate;

means for defining a flow of developer along a flow path from said sump through said orifice, past said development roll and back to said sump;

a flow gate carried by said movable section for movement toward and away from said orifice to selectively interrupt said flow of developer along said path or pass said flow, respectively;

a catch mounted in part on said movable section and in part on said stationary section for releasably latching said sections together; and

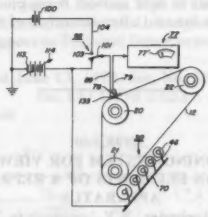
means for interlocking said flow gate and said catch, said interlocking means permitting said flow gate to be moved toward and away from said orifice when said sections are latched together, but preventing said sections from being de-latched until said flow gate has been positioned to interrupt said flow.

3,998,538

ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES

Charles J. Urso, Webster; Charles D. Wilson, Pittsford, and John E. Courtney, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 24, 1975, Ser. No. 552,019
Int. Cl.² G03G 15/00; G01R 31/02
U.S. Cl. 355—3 R 7 Claims



6. In an electrostatic reproduction machine for providing copies of originals including a movable photoreceptor, means to charge said photoreceptor in preparation for imaging, exposure means to selectively discharge said photoreceptor in accordance with the original being copied to form a latent electrostatic image on the photoreceptor, and means to develop the latent electrostatic image, the developing means including at least one developer element adapted to bear an electrical bias, and voltage producing means for placing an electrical bias on said developer element, the combination of:

measuring means to determine the plate voltage on a surface without contacting said surface, said measuring means including a probe adapted for disposition adjacent said surface,

means to position said probe a preset distance from said surface whereby said probe produces a signal reflecting the plate voltage of said surface,

means for coupling said surface to said voltage producing means whereby to determine the voltage output of said voltage producing means with said measuring means,

said probe positioning means being adapted to position said probe in preset spaced relationship with said photoreceptor whereby to permit voltages on said photoreceptor to be determined by said measuring means, and

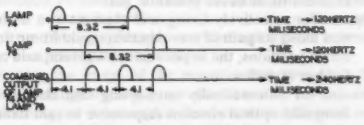
means for supporting said surface in spaced juxtaposition with said photoreceptor and said probe positioning means whereby said probe positioning means is adapted selectively to locate said probe opposite either said photoreceptor or said surface.

3,998,539

ILLUMINATION SYSTEM

Wayne L. Kidd, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 10, 1975, Ser. No. 556,840
Int. Cl.² G03G 15/04
U.S. Cl. 355—4 7 Claims



1. An electrophotographic printing machine for reproducing an original document, including:

a photoconductive member;

means for charging said photoconductive member to a substantially uniform potential; and

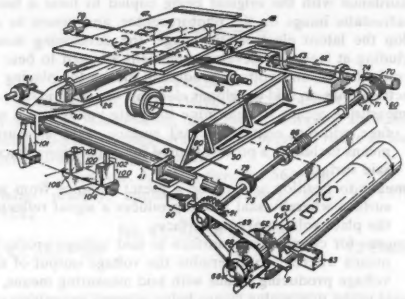
means for exposing the charged portion of said photoconductive member to record thereon an electrostatic latent image corresponding to the original document, said exposing means comprising a pair of light sources for illuminating the original document and means for periodically energizing each of the pair of light sources in a timed relationship with one another so that alternately one of the pair of light sources is energized with the other of the pair of light sources being de-energized, wherein each of the pair of light sources is energized at an equal rate with one of the pair of light sources being energized at a preselected time interval after the other of the pair of light sources.

3,998,540

REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS

Paul Weinstein, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 24, 1975, Ser. No. 634,966
Int. Cl.² G03G *15/28*
U.S. Cl. 355—8 **22 Claims**



1. In a reproducing apparatus for producing copies of a document comprising:

a photosensitive surface arranged for movement at a given velocity;

means for viewing a document and for projecting an image thereof onto said surface, said viewing means including a first optical element and means for supporting said first optical element for movement along a first path of travel between a home position and an end of travel position;

drive means for moving said element between its respective home and end of travel positions;

a flexible member coupling said drive means to said element, said drive means being arranged to advance said flexible member in a first direction to move said element from said home position to said end of travel position or in a generally opposing second direction to return said element to its home position; and

means for selectively fixing said element at a desired position along its path of travel between said home and end of travel positions; the improvement wherein, said apparatus further includes:

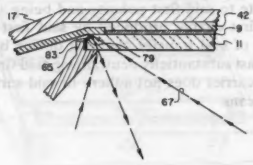
means for automatically uncoupling said flexible member from said optical element responsive to said fixing of said element at said desired position and the continued movement of said flexible member in said first direction, and for automatically recoupling said flexible member to said optical element upon movement of said flexible member in said second direction to return said element to said home position.

3,998,541

ILLUMINATION ARRANGEMENT PROVIDING FOR INTERFRAME FLASHDOWN

Alfred J. Michaloski, Henrietta, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 18, 1975, Ser. No. 569,507
Int. Cl.² G03G *15/00*
U.S. Cl. 355—11 **9 Claims**



1. A copier including a photoconductor for establishing a latent electrostatic image of an object to be copied, said copier comprising:

supporting structure including a transparent platen for supporting in a first area the object to be copied, said structure defining surfaces in a second area outwardly adjacent said first area having properties suitable for diffusely reflecting light to the photoconductor;

flash means for simultaneously illuminating the object and said second area with diffuse light to which the photoconductor is sensitive;

means for projecting light reflected from the object onto said photoconductor in an area defining an image frame on said photoconductor, and for projecting light from said second area onto said photoconductor defining an interframe on said photoconductor in a area outside and adjacent said image frame; and

directional reflecting means in said second area for enchancing the light reflected from said area and projected onto said interframe; said directional reflecting means defining a surface oriented to direct light from said illuminating means toward said projecting means.

3,998,542

PHOTOCONDUCTOR STORING APPARATUS FOR AN ELECTROSTATIC COPIER

John A. Toto, Milford, and William E. Pennings, S. Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 20, 1974, Ser. No. 481,048
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 **8 Claims**

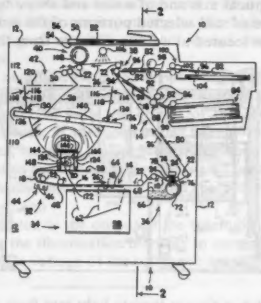
1. In a copier including a strip-type photoconductor having a plurality of photoconductive sections connected in series for folding on top of one another, and means for serially feeding the photoconductive sections to and from a storage station, apparatus for storing the photoconductive sections in a zig-zag folded stack at the storage station comprising:

a. a receptacle having an inlet opening and an outlet opening through which the photoconductive sections are respectively fed to and from the stack, said receptacle including a pair of oppositely spaced walls extending relatively convergently towards one another for guiding the folds of the respective photoconductive sections progressively closer to the outlet opening than the mid-portions thereof in transit through the receptacle;

b. a pair of tamping means respectively movably engaging opposite receptacle walls and cooperating therewith for guiding photoconductive sections toward the outlet opening; and

c. means for moving the respective tamping means out of

step with one another toward and away from the stack including means for resiliently interconnecting the respective tamping means to the moving means so as to



maintain each of the tamping means in movable engagement with the receptacle wall associated therewith when the tamping means are moved toward and away from the stack.

3,998,543

DUAL OPTICAL PROJECTION SYSTEM FOR COPYING MACHINES

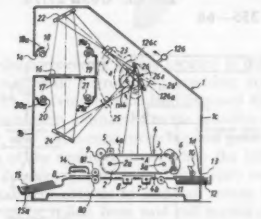
Richard Wick, and Jurgen Orthmann, both of Munich, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 2, 1975, Ser. No. 574,094

Claims priority, application Germany, May 17, 1974, 2424191

Int. Cl.² G03B 27/32, 27/52

U.S. Cl. 355—24 **12 Claims**



1. In a copying machine, particularly in a xerographic copying machine for integral imaging of originals, a combination comprising light-transmitting support means onto which an original can be placed so that a first side thereof faces toward and a second side thereof faces away from said support means; a substantially flat image-receiving surface; means for illuminating an original on said support means comprising at least one first light source arranged to illuminate said first side and at least one second light source arranged to illuminate said second side of the original on said support means; projection means for imaging onto said surface a selected side of the original on said support means, said projection means comprising switchover means actuatable to select that side of the original on said support means whose image is to be projected onto said surface, first and second projection units for respectively projecting the image of said first and said second side of the original on said support means, said projection units comprising a common image mirror which constitutes said switchover means; means for moving said mirror to a first position in which said mirror reflects onto said surface the image of the first side of the original on said support means and a second position in which said mirror reflects onto said surface the image of the second side of the original on said support means; and lens means for respectively imaging onto said mirror the first and second sides of an original on said support means when said mirror is respectively maintained in said first and second positions.

3,998,544

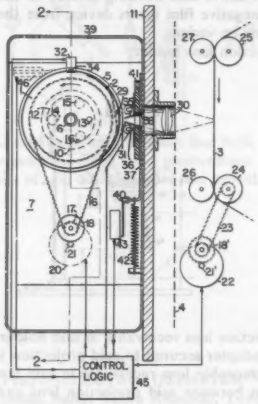
SYNCHRONOUS AUXILIARY CAMERA PROJECTOR

Herman W. Pass; John S. Burton, both of Los Angeles; Ronald L. Whitney, Reseda, and Forest L. Langford, Northridge, all of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Filed June 13, 1975, Ser. No. 586,687

Int. Cl.² G03B 27/52

U.S. Cl. 355—40 **14 Claims**



1. The method of exposing title information upon a microfiche film, which includes the steps of;

a. exposing frames over an area of one microfiche group,

b. linearly translating said microfiche film (3) a distance related to the extent of one microfiche group,

c. simultaneously rotatively displaying title information (2), and

d. simultaneously incrementally exposing said microfiche film by an image of said title information

which moves synchronously with the translation of said microfiche film.

3,998,545

ANAMORPHIC ENLARGING SYSTEM

Jon Hall, Santa Monica, Calif., assignor to Optivision Inc., Santa Monica, Calif.

Filed Mar. 26, 1975, Ser. No. 562,259

Int. Cl.² G03B 27/68, 27/32

U.S. Cl. 355—52 **3 Claims**

1. A method of making anamorphic enlargements from a negative film containing an image squeezed in one dimension resulting from photographing a scene through a given anamorphic lens, comprising the steps of:

a. projecting the image of the negative film towards a flat surface through a given projection lens;

b. positioning an anamorphic lens corresponding to said given anamorphic lens between the projection lens and said surface to unsqueeze said image;

c. positioning a given dioptor lens between said anamorphic lens and said surface to provide a projected picture size on said surface corresponding to a given format;

d. moving the negative film, projection lens, anamorphic

lens and dioptor lens as a unit towards and away from said surface to effect exact registration of said projected picture size and said given format;

e. moving said projection lens, anamorphic lens and dioptor lens only as a unit relative to said negative film to effect a fine focusing of said image on said format;

f. exposing print paper of said given format to said image on said surface; and,

g. developing said print paper to provide said enlargement.

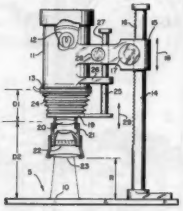
3. An anamorphic enlarging system comprising, in combination:

a. a table defining a flat working surface for receiving printing paper upon which an anamorphic negative film image is to be projected;

b. a projection housing including a light source and supporting a negative film insert device;

c. a first adjustable means supporting said housing in a position above said working surface so that the distance of the negative film insert device from the working surface may be varied;

d. a projection lens holder;



e. a projection lens receivable in said holder;

f. a lens adapter secured to said projection lens holder;

g. an anamorphic lens receivable in said lens adapter in a position between said projection lens and said working surface;

h. dioptor lens means receivable in said lens adapter between said anamorphic lens and said working surface;

i. a light bellows connected between said projection lens holder and said housing; and

j. a second adjustable means supporting said projection lens holder to said housing in a position between said negative film insert device and said working surface such that said projection lens holder, projection lens, lens adapter, anamorphic lens and dioptor lens means may be moved as a unit towards and away from said negative film insert device, whereby the size of a projected anamorphic film negative image on said working surface may be varied to fit a selected format by operating said first adjusting means and said projected image then brought into exact focus by operating said second adjusting means.

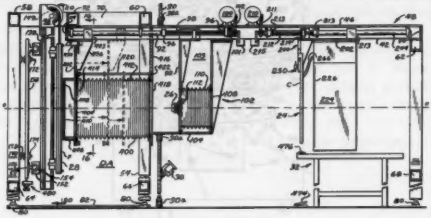
3,998,546

MULTI-IMAGE REPRODUCING APPARATUS

Joseph H. Wally, Jr., Shawnee Mission, Kans.; Robert Lee Wall, Raytown, Mo., and Samuel Edward Wilson, Mission, Kans., assignors to Filminiature Systems, Inc., Kansas City, Mo.

Filed May 5, 1975, Ser. No. 574,466
Int. Cl.² G03B *27/42*
U.S. Cl. 355—53 **32 Claims**

1. In combination, an objective lens having an optical axis, a subject holder having a flat copy supporting side centered on and at right angles to said optical axis, an indexing plate having a side adapted to support film thereon in a plane at right angles to said optical axis, said plate being movable in directions at right angles to said optical axis and parallel to said plane to successively center selected portions of said plate of predetermined size and shape on said optical axis to receive an image of copy on the subject holder when directed by the image forming rays of the objective to said plane on its optical axis, a frame member between the objective and the indexing plate adapted to support a mask having an aperture centered on the optical axis and of a size and shape related to the size and shape of said selected portions of the indexing plate such that when located at a finite distance from the indexing plate



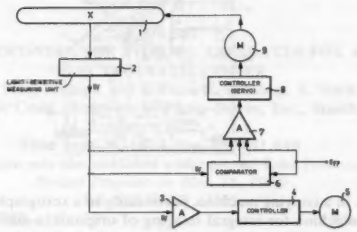
immediately adjacent thereto light rays from the objective are limited to the selected portion of the indexing plate centered on the optical axis, said mask supporting frame member being axially retractable from the indexing plate to permit loading and unloading of film, and releaseable latch means for locating the supporting frame member and the mask at said finite distance from the indexing plate.

3,998,547

PROCESS AND APPARATUS FOR AUTOMATICALLY CHANGING THE ILLUMINATION INTENSITY OF THE LIGHT SOURCE IN A COPYING APPARATUS

Herbert Schröter, and Werner Dennhardt, both of Taunusstein, Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Aug. 5, 1975, Ser. No. 602,089
Claims priority, application Germany, Aug. 10, 1974, 2438491
Int. Cl.² G03B *27/78*
U.S. Cl. 355—68 **6 Claims**



1. A process for automatically changing the illumination intensity of a light source in a copying apparatus in which the transparency of the original is measured with at least one light-sensitive measuring unit and in which, based on the measured transparency, a signal is passed on from this measuring unit for controlling the speed of a drive motor, comprising comparing the signal coming from the light-sensitive measuring unit and passed on for controlling the speed of the drive motor with a predetermined signal corresponding to the highest speed of the drive motor and, if the measured signal requires a higher speed than that of the predetermined signal, the difference of the two signals is formed and the illumination intensity is controlled in correspondence with this difference signal.

2. An apparatus for automatically changing the illumination intensity of a light source in a copying apparatus with at least one light-sensitive measuring unit for measuring the transpar-

ency of the original and a device for controlling the speed of a drive motor by the signal coming from the measuring unit, comprising

a. a comparator means which compares the signal coming from the light-sensitive measuring unit with a predetermined input voltage corresponding to the highest speed and, if the signal requires a higher speed, supplies an output signal,

b. a reference amplifier means acting as a difference former to which the same predetermined input voltage is applied, which is connected with the output of the comparator means and which, if the comparator means supplies an output signal, supplies an output voltage itself which is proportional to the difference of the signal coming from the light-sensitive measuring unit and the predetermined input voltage, and

c. means connected to the output of the reference amplifier for changing the illumination intensity in correspondence with the output voltage of the reference amplifier means.

3,998,548

SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE

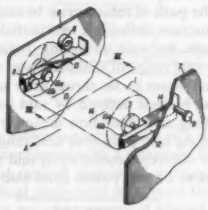
Susumu Wakatsuki, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Aug. 7, 1975, Ser. No. 602,781

Claims priority, application Japan, Aug. 8, 1974, 94060/74

Int. Cl.² G03G *15/00*

U.S. Cl. 355—133 **5 Claims**



1. A sensitive drum receiving device located in the housing of an electrophotographic reproducing machine, comprising (a) rail means, (b) a driving mechanism disposed above said rail means and releaseably connected to the sensitive drum for driving the drum, said rail means receiving and guiding opposite end portions of the sensitive drum when the latter is released from said driving mechanism and (c) rotary supporting means so disposed with respect to said rail means that said sensitive drum may be rolled from said rail means onto said rotary supporting means to rotatably support the sensitive drum for maintenance thereof.

3,998,549

METHOD FOR MEASURING THE TEMPERATURE OF AXLE BEARINGS OF VEHICLES

Günter Pusch, Bannholzweg 12, 6903 Neckargemund, and Jens Dührkopp, Hirschgasse 23, Neckargemund, both of Germany

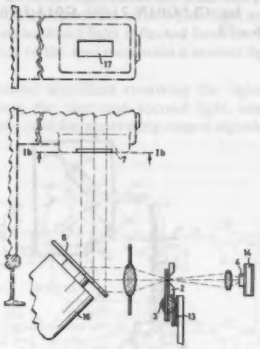
Filed Aug. 28, 1974, Ser. No. 501,213

Claims priority, application Germany, Aug. 31, 1973, 2343904

Int. Cl.² G01J *5/62*

U.S. Cl. 356—48 **8 Claims**

1. The method of detecting the temperature of axle bearings of vehicles including steps in combination which comprise: establishing a source of infra red radiation of known value, and supplying infra red radiation from the axle bearing to be measured and radiation from said source alternately to a detector and developing an alternating voltage in conformity with the detected radiation, and measuring the said voltage, said infra red radiation from the axle being that radiation which is supplied vertically downward therefrom within the range of a strip of predetermined dimensions, interposing a modulator between the axle and the detector, controlling the



temperature of said modulator in a way that both the modulator and the detector have the same temperature, and reflecting the radiation of said detector from said modulator back to said detector.

3,998,550

PHOTOELECTRIC OXIMETER

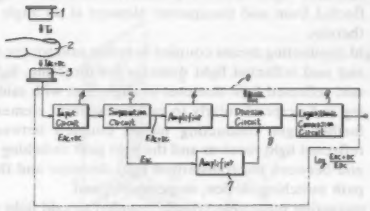
Masaichiro Konishi, Suita; Tohru Kisanuki, Toyokawa; Akio Yamanishi, Tondabayashi, and Yutaka Majima, Toyokawa, all of Japan, assignors to Minolta Camera Corporation, Osaka, Japan

Filed Oct. 10, 1975, Ser. No. 621,278

Claims priority, application Japan, Oct. 14, 1974, 49-118543

Int. Cl.² G01N *33/16*

U.S. Cl. 356—39 **19 Claims**



1. A monitoring device for photoelectrically obtaining information relating to a characteristic of the presence of arterial blood in living tissue comprising:

a light source capable of providing a light signal;

means for photoelectrically converting light from the light source, under the optical influence of living tissue, to a first output signal;

means for separating a direct current component from said first output signal; and

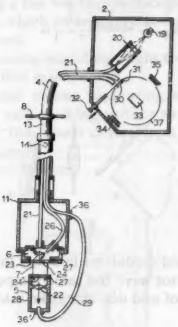
means for producing an output signal representative of a logarithm of a quotient of said first output signal divided by said separated direct current component.

3,998,551

DEVICE FOR MEASURING STIMULUS VALUES OF THE COLOR OF A LIQUID

Shigeru Suga, Yoyogi 5-20=2, Shibuya, Tokyo, Japan

Filed Nov. 20, 1975, Ser. No. 633,908
Int. Cl.[2] G01N 21/00; G01J 3/46
U.S. Cl. 356—73 2 Claims



1. A device for measuring three stimulus values of the color of a liquid as a way of determining the color of the liquid, comprising:

an optical part having a source of light, an integrating ball having an inlet for light and three light receiving elements therein, and a light path switching device at said inlet;

an immersible detector having a reflected light detector and a transmitted light detector as a part thereof, said reflected light detector having an opening therein and a flat transparent element covering said opening in liquid tight relationship therewith, said transmitted light detector being spaced from and aligned with said opening in said reflected light detector, a reflected light receiver in said reflected light detector positioned to receive light reflected from said transparent element at an angle of 45° thereto;

light conducting means coupled between said source of light and said reflected light detector for directing. light into said reflected light detector in alignment with said opening and perpendicularly to said transparent element, and further light conducting means coupled between the reflected light receiver and the light path switching device and between the transmitted light detector and the light path switching device, respectively; and

a measuring means electrically coupled to said light receiving elements in said integrating ball for indicating the amount of light received thereby;

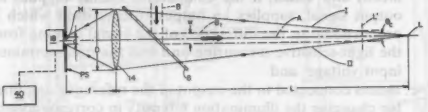
whereby when the immersible detector is immersed in a liquid the color of which is to be determined, the liquid fills the space between the reflected light detector and the transmitted light detector, and the transmitted light and reflected light are conducted to the light path switching device, and one type of light is first admitted to the integrating ball and the three stimulus values of the one type of light are measured by the measuring means, and then the light path switching device is actuated to admit the other type of light and the three stimulus values of the other type of light are measured.

3,998,552

INSTRUMENT RESPONSIVE TO BACK-SCATTERED OR BACK-REFLECTED RADIATION HAVING PASSIVE SYSTEM FOR RANGE CORRECTION

Harold S. Stewart, North Andover; Marion P. Shuler, Jr., Boston, and Willem Brouwer, Lexington, all of Mass., assignors to HSS, Inc., Bedford, Mass.

Filed Aug. 19, 1974, Ser. No. 498,372
Int. Cl.[2] G01N 21/00; G01P 3/36
U.S. Cl. 356—103 18 Claims



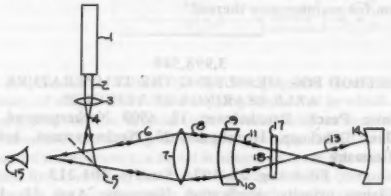
1. In a radiometric instrument for responding to the intensity of backscattered including backreflected radiation from a path through a medium over a given desired detection range comprising means for transmitting a beam of electromagnetic radiation along said path, and a receiver system arranged to receive backscattered radiation returning along said path substantially coaxially with said beam, the receiver system including detection means for the backscattered radiation and equalizing means for producing a substantially equal receiver sensitivity regardless of the distance of the point of backscatter along the path, the improvement wherein said equalizing means comprises a passive radiation transmission structure interposed in the path of return prior to said detection means, said passive structure defining a substantially constant acceptance solid-angle for said returning radiation from points extending over said range of said path, and means defining the diameter of said beam to lie throughout said range substantially within the bounds defined by said solid angle whereby radiation reaching said detection means from various points spaced apart along said path over said range does not vary in intensity due to different sensitivity of said receiver system for different distances of said points from said detection means.

3,998,553

DEVICE AND METHOD FOR TESTING HIGH REFLECTIVITY AUTOSTIGMATIC OPTICAL ELEMENTS AND SYSTEMS

George C. Hunter, Middletown, and Paul F. Forman, Weston, both of Conn., assignors to Zygo Corporation, Middlefield, Conn.

Filed May 12, 1975, Ser. No. 576,963
Int. Cl.[2] G01B 9/02
U.S. Cl. 356—109 7 Claims



1. In a spherical wavefront interferometer for testing a highly reflective autostigmatic test article consisting of (1) a source of light (2) means for passing said light, as an expanded beam, through (3) a partially transmissive, partially reflective spherical reference surface to produce a reflected reference wavefront, and a transmitted converging spherical test wavefront which is directed toward (4) the common center of curvature of said reference surface and said highly reflective autostigmatic test article, and said test wavefront then probes

(5) said test article and is reflected therefrom back through said reference surface and (6) means for interfering both said reflected reference wavefront and said reflected test wavefront, the improvement which consists in placing, between said reference surface and said test article a partially transmissive, thin coated pellicle which has a transmission factor T which approximates

$$T = \left[\frac{R_{rs}}{R_{ts}(1-R_{rs})^2}\right]^{1/2}$$

where R_{rs} is the reflectivity of the reference surface, and R_{ts} is the reflectivity of the test article.

3,998,554
OPTICAL ALIGNMENT TECHNIQUES

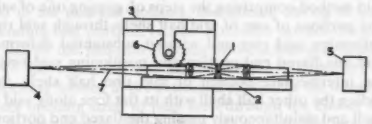
James Morriss Burch, Byflest, and David Charles Williams, Croydon, both of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Apr. 10, 1975, Ser. No. 566,768

Claims priority, application United Kingdom, Apr. 11, 1974, 16369/74

Int. Cl.² G01B *11/26*

U.S. Cl. 356—138 **23 Claims**



1. Apparatus for indicating departures of a fiducial element of position from coincidence with a relatively fixed datum axis including an afocal optical system of unitary magnification comprising the optical equivalent of at least three thin lenses, two of which lenses are outermost and spaced apart, each of the said lenses of the said optical system being disposed symmetrically about a common optical axis which is arranged to include the said fiducial element, the said optical system being operative to produce an image of an object which image and object are characterised by an objectimage distance in excess of five times the distance between the said two outermost spaced apart lenses, the said optical system being capable, when producing an image of an object, both of defining the said relatively fixed datum axis as an axis through the said object and a first image position, and of indicating departures of the said optical axis and the included fiducial element from coincidence with the said datum axis by virtue of the said departures giving rise to shifts of the said image away from the said first image position.

3,998,555
COLOR GRADING APPARATUS

Raymond E. Babb, Freemont, Calif., assignor to Genevieve I. Hanscom and Genevieve I. Hanscom, Robert Magnuson and Lois J. Thomson, as trustees of the estate of Roy M. Magnuson, all of San Jose, Calif., part interest to each

Continuation of Ser. No. 407,641, Oct. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 205,792, Dec. 8, 1971, abandoned. This application Dec. 9, 1974, Ser. No. 530,961

Int. Cl.² G01M *21/22*; B07C *5/10*

U.S. Cl. 356—178 **4 Claims**

1. A system for measuring the ratio of light reflectance of various products at two spaced areas of the light spectrum, comprising the combination of:

means supporting the product to be measured;

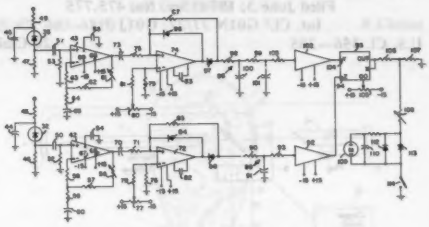
light source means for directing light including the two areas of the light spectrum onto the product;

a pair of first and second light sensitive cells for generating light responsive signals in response to the light received;

first means to direct light reflected from the product in a first area of the spectrum onto a first light sensitive cell;

second means to direct light reflected from the product in a second area of the spectrum onto a second light sensitive cell;

first and second amplifiers receiving the light responsive signals from the first and second light sensitive cells, respectively, and for generating output signals responsive thereto:



means to receive and compare the output signals from the amplifiers and generate a signal in response to the ratio of the signals;

readout means for indicating the ratio of the signals;

a calibrating disc having a known ratio of light reflectance in the first and second areas of the spectrum positioned to receive light from said light source means and reflect light to the first and second means at preselected time periods onto the light sensitive cells; and

means to adjust the level of amplification of one of the first and second amplifiers for adjusting the readout to said known ratio reading during said preselected time periods.

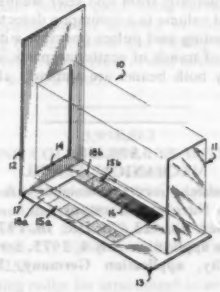
3,998,556
COLOR CONTRAST GAUGE

Robert V. Wright, Cloquet, Minn., assignor to Potlatch Corporation, San Francisco, Calif.

Filed June 23, 1975, Ser. No. 589,359

Int. Cl.² G01J *3/48*

U.S. Cl. 356—186 **3 Claims**



2. A color contrast gauge, comprising:

a. a substantially flat frame having a window opening formed therein;

b. a predetermined optical filter arranged within said window being integrally bonded to said frame; and

c. a color scale visible through said filter comprising two sections; a light color section and a dark color section, each section comprising a plurality of color portions with

each portion varying in density; each light color portion having a related color portion in the dark color section, the relationship between each light color portion and its related dark color portion being such that when the light color portion corresponds to a pre-selected background color then the density of a color symbol bar to be printed on said background color must be as dark as or darker than the dark color portion.

3,998,557

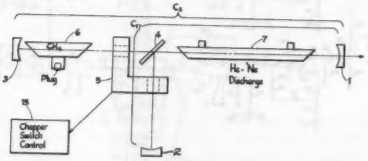
GAS DETECTOR

Ali Javan, Boston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed June 3, 1974, Ser. No. 475,775

Int. Cl.² G01N *21/22*; G01J *3/46*

U.S. Cl. 356—205 **20 Claims**



1. In a detector for a prespecified gas having a given absorption resonance for optical radiation comprising laser means for producing first and second beams, said first beam having a first wavelength corresponding to said resonance and said second beam having a second wavelength relatively close to that of said second beam but outside the effective absorption curve of said gas, means arranged to cause said beams to transit a volume through which optical scattering particles may pass and in which said gas to be detected may be present, to enable absorption of said first beam, detection means for detecting said beams after said transit and comparison means for comparing said detected beams and producing an output indicating the presence or absence of said gas in said volume, the improvement wherein the laser means comprises a predetermined lasing medium selected to have two characteristic lines corresponding to said first and second wavelengths and two distinct resonant lasing cavities employing said lasing medium for producing said beams, said lasing cavities including at least one common operative means subject to variation, both beams thereby being similarly affected by said variation, and switching means for causing alternating pulses of said two beams to pass colinearly from said laser means via a common path through said volume to a commpon detecting device, said means for alternating said pulses operable with a period less than the period of transit of scattering particles through said volume whereby both beams are similarly affected by said particles.

3,998,558

MECHANICAL PENCIL

Otto Katz, Schwabach, Germany, assignor to A. W. Faber-Castell, Stein near Nurnberg, Germany

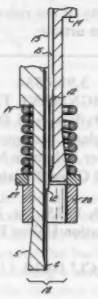
Division of Ser. No. 423,476, Dec. 10, 1973, Pat. No. 3,922,098. This application July 1, 1975, Ser. No. 592,252

Claims priority, application Germany, Dec. 8, 1972, 2260065

Int. Cl.² B43K *21/22*

U.S. Cl. 401—94 **4 Claims**

1. A method of assembling a lead feed collet from a resiliently deformable clamping ring formed of plastic material and having a predetermined internal diameter, and from a pair of identical and interfittable collet half shells formed of high-strength resilient plastic material and each having a flared end portion, a semi-cylindrical end portion, and an intermediate portion between said end portions, each of said half shells having a flat face fittable against the flat face of the other half shell, said flared end portions forming with said faces lying flatly against each other a generally frustoconical surface at its widest portion of an outer diameter substantially greater than said inner diameter, said intermediate portions forming with said faces lying flatly against each other an outer surface of an outer diameter smaller than said inner diameter and said semicylindrical end portions forming with said faces lying flatly against each other a generally cylindrical surface with an outer diameter substantially greater than said inner diameter and than said outer diameters of said frustoconical surface,



said method comprising the steps of: passing one of said flared end portions of one of said half shells through said ring while deforming said ring and without substantial deformation of said one flared end portion and positioning said ring around the intermediate portion of said one half shell; thereafter sliding the other half shell with its flat face along said one half shell and simultaneously passing the flared end portion of said other half shell through said ring with deformation thereof but without substantial deformation of said flared end of said other half shell; and thereafter aligning said half shells with their end and intermediate portions next to each other and said ring surrounding said intermediate portions.

3,998,559

DISPOSABLE FOUNTAIN APPLICATOR

Earl Hoyt, 127 E. Crescent Ave., Ramsey, N.J. 07446

Filed July 28, 1975, Ser. No. 599,469

Int. Cl.² A47L *13/17*

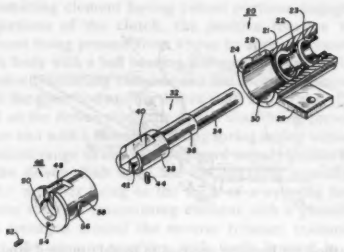
U.S. Cl. 401—132 **5 Claims**

1. A fountain liquid applicator device comprising a liquid absorbent flexible porous sponge head having a top face, a flexible, frangible liquid impervious sheet overlying and secured to said sponge head top face and a liquid reservoir located atop said sheet and having a bottom opening with a peripheral border in liquid tight securement to said sheet, said reservoir including inner walls downwardly converging to an apex proximate and unattached to said sheet, whereby compression of said sponge and reservoir effects the piercing of said frangible sheet by said apex to fracture said sheet to provide a communication opening between said reservoir and said sponge head.

3,998,560
AUTOMATICALLY CLOSED COUPLINGS

Lawrence R. Damour, 16 Chesler Square, Succasunna, N.J. 07876

Filed Apr. 27, 1976, Ser. No. 680,674
Int. Cl.² F16D 1/12
U.S. Cl. 403—26 12 Claims



1. An automatically closed coupling for shafts on which are carried reels, spools, rolls and the like, each end of the shaft having a driving means, said coupling including: (a) a pedestal having a housing portion and means for fixedly securing to a support; (b) antifriction bearing means carried in said pedestal housing; (c) a spindle carried in said bearing means so as to be free turning therein, said spindle further secured for axial retention in the pedestal housing, the spindle having at least one extending end portion; (d) an extension portion formed on one end of the pedestal housing and enclosing at least a portion of the extending end portion of the spindle; (e) an access opening formed in the extension portion of the housing, this access opening sized to pass therethrough the end of the shaft to be mounted in the coupling; (f) a U-shaped receiver and opening formed in the extending end of the spindle, this U-shaped opening sized to slidably receive and retain the end of the shaft to be carried in the coupling; (g) cooperative means provided in the U-shaped opening in the spindle and on the end of the shaft to insure that the shaft end when mounted in the U-shaped opening is prevented from relative rotative motion of the shaft and spindle; (h) a collar member slidably carried on the extending portion of the spindle, this collar member both rotatable and axially movable on and over the extending portion of the spindle, the collar member having an access opening through one side thereof, said opening when aligned with the U-shaped opening in the shaft and the access opening in the housing providing a passageway through which is passed the end of the shaft for mounting and carrying in the U-shaped opening in the spindle, the access opening in the coupling occupying no more than about one-quarter of the coupling diameter at the point where it is adjacent the U-shaped receiver opening in the spindle; (i) a cam track and cam track actuating member interactively and cooperatively carried by and formed on the extending portion of the spindle and collar member and adapted to permit relative rotational displacement of about a quarter revolution between the spindle and collar from the position whereat the U-shaped receiver opening in the spindle and the access opening in the collar are in alignment, and at this quarter revolution displacement the cam track is constructed so as to engage the actuating member to move the collar axially a short distance along the shaft extension, and (j) restriction means cooperatively carried by the collar and pedestal housing to inhibit turning of the collar in relation to the pedestal until the cam track engaging member engages the end of the track to cause axial movement sufficient to disengage the restriction means allowing free turning of the spindle in the bearings whereby when a shaft is passed through the aligned openings in the pedestal housing, the collar member and the U-shaped receiver opening in the spindle are seated in the U-shaped opening and about a quarter revolution of the shaft is made, the spindle turns with the shaft a like amount whereby the coupling which has not yet turned because of the restrictive means has a portion of the coupling brought in way of the U-shaped opening in the spindle to trap and retain the shaft end in the coupling as and until the coupling is manipulated to align the several access openings for removal of the shaft.

3,998,561
FRICTION GROMMET

Bernhard Rohland, Molndal, Sweden, assignor to Gerro Holding Company Limited, Vaduz, Liechtenstein

Filed Jan. 9, 1976, Ser. No. 647,777
Claims priority, application Sweden, Jan. 9, 1975, 7500203
Int. Cl.² F16G 1/14
U.S. Cl. 403—210 8 Claims

1. A friction grommet for retaining the end portion of a rope comprising a locking lid piece and a bottom piece, said bottom piece being provided with an upright and an adjacent pin projecting in the same direction from one side thereof, said upright having an axial aperture and locking beams projecting radially into the aperture to define grooves between the beams, said locking lid piece being provided with an upright projecting from one side thereof and having radially projecting locking beams which are shaped to fit into the grooves of said upright of said bottom piece, the locking lid piece and the bottom piece being adapted to be locked to each other by insertion of the locking lid piece upright into the aperture of the bottom piece upright with the locking beams of the locking lid piece upright fitting into the grooves in the bottom piece upright between the locking beams of the latter, whereby upon the turning of one of said pieces relative to the other the locking beams of the upright of the locking lid piece are placed into abutment against the adjacent faces of the locking beams of the upright of the bottom piece, said locking lid piece and said bottom piece being further provided with cooperating locking means adapted to interlock upon said relative turning of said bottom and locking lid pieces to prevent any inadvertent dislocation of said bottom and locking lid pieces relative to each other.

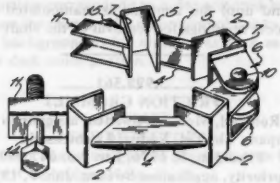
3,998,562
SUPPORTING COLLAR FOR USE WITH BUILDERS SCAFFOLDING

Peter Eric Gostling, Sutton Coldfield, England, assignor to C. Evans & Sons Limited, Ilford, England

Filed Nov. 24, 1975, Ser. No. 634,488
Int. Cl.² F16B 2/10; E04G 7/14
U.S. Cl. 403—235 9 Claims

1. A supporting collar for attachment to an upright member of a builders scaffold for access and propping purposes, said collar having four radially disposed open-sided support brackets arranged so that the open ends of said brackets are directed inwardly towards each other and are disposed about a circle, and means outside the confines of said circle interconnecting said support brackets, said collar specifically including two collar parts which, at one end, are hingedly connected together and, at the other end, are detachably interconnected, each of said collar parts including two of said support brack-

ets, a web fixedly secured at its ends to adjacent side walls of said brackets, a hinge element fixed to the other side wall of one of said brackets, and an extension piece fitted to the other



side wall of the other of said brackets, whereby, in the position of use, said free ends of said support brackets bear directly against the outer peripheral surface of said upright member.

3,998,563

DETACHABLE COUPLING DEVICE

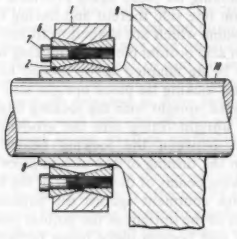
Ulrich Klören, Krefeld, Germany, assignor to Ringfeder G.m.b.H., Krefeld-Uerdingen, Germany

Filed Apr. 28, 1975, Ser. No. 572,299

Claims priority, application Germany, July 15, 1974, 7423987[U]

Int. Cl.² F16D 1/06

U.S. Cl. 403—370 8 Claims



2. In a detachable coupling device for transmitting high torque to a rotatable element, a combination comprising a rotatable element having an axis and a hub having an axially extending sleeve attachment; an inner circumferentially-incomplete ring positioned about said sleeve attachment and having a contoured outer circumferential surface; an outer circumferentially complete ring having a larger diameter than the diameter of said inner ring so as to be spaced radially of the latter and having a contoured inner circumferential surface which defines with said contoured outer circumferential surface of said inner ring a pair of axially spaced V-shaped recesses converging axially inwardly towards each other, said outer ring having in axial section a larger cross-sectional area than said inner ring; a pair of axially spaced clamping rings each at least partially received in one of said recesses, each of said clamping rings having V-shaped surface portions adapted to wedge against the surfaces defining said V-shaped recesses when said clamping rings are drawn towards each other a plurality of clamping screws mounted circumferentially spaced from each other on said clamping rings and operative to draw the latter together, thereby generating a radial clamping force on said rotatable element; and a shaft extending through and supported in said sleeve attachment.

3,998,564

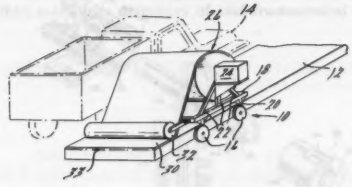
GROOVE FORMING METHOD FOR CONCRETE ROADWAYS

Richard A. Serlin, 10 Barbour Lane, Bloomfield Hills, Mich. 48013

Filed Sept. 2, 1975, Ser. No. 609,490

Int. Cl.² E01C 23/02

U.S. Cl. 404—89 5 Claims



1. A method for forming grooves in freshly-poured concrete roadways, said method comprising the steps of

positioning a sheet of flexible material on said freshly-poured concrete roadway, said sheet having a plurality of parallel, closely-spaced ribs on the side facing said roadway,

impressing said sheet onto said surface of said roadway in order to embed said ribs into said freshly-poured concrete and form said grooves,

allowing the concrete roadway to set, and

removing said sheet from said roadway after the concrete has set whereby permanently formed and precisely defined grooves are revealed.

3,998,565

TAPPER INCORPORATING REVERSE ROTATION MECHANISM

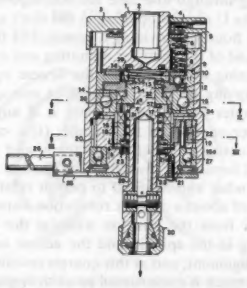
Yuzuru Tanaka, Daito, Japan, assignor to Daisyowa Seiki Co., Ltd., Osaka, Japan

Filed Oct. 25, 1974, Ser. No. 518,182

Claims priority, application Japan, Jan. 9, 1974, 49-6205[U]

Int. Cl.² B23B 47/14; B23G 3/00

U.S. Cl. 408—132 2 Claims



1. A tapper incorporating a reverse rotation mechanism and comprising a rotatable tapper main body, a positive rotation transmitting element disposed in the main body and rotatable therewith, a reverse rotation transmitting element disposed in the main body and rotatable by the main body in a direction opposite to the direction of rotation of the main body, a holder member disposed in a lower portion of the main body, a driven shaft for holding a tap supported by the holder member and rotatable in positive and reverse directions, the driven shaft being axially movable, a clutch for switching over the direc-

tion of rotation mounted in axially movable manner on the driven shaft and selectively engageable with the positive rotation transmitting element or with the reverse rotation transmitting element to rotate the driven shaft in positive or reverse direction, each of the positive rotation transmitting element, the reverse rotation transmitting element and the clutch being in the form of an integral cylindrical member, each of the positive rotation transmitting element and the reverse rotation transmitting element having cutout portions engageable with projections of the clutch, the positive rotation trasmitting element being pressed from above by springs mounted on the main body with a ball bearing interposed between the positive rotation trasmitting element and the springs to trasmit torque from the main body to the driven shaft and to absorb an excess load on the driven shaft, the driven shaft being provided on its upper end with a shock absorbing spring acting within a predetermined range to absorb an upward impact load to be exerted on the driven shaft upon the tap engaging a workpiece, the holder member being in the form of a cylinder housing the reverse rotation transmitting element with a plurality of pinions arranged around the reverse rotation transmitting element, the pinions meshing with teeth formed in the inner peripheral surface of the main body and with teeth formed in the outer peripheral surface of the reverse rotation transmitting element, each of the clutch and the reverse rotation transmitting element being provided with a spring for absorbing an axially downward impact load.

3,998,566

BORING HEADS

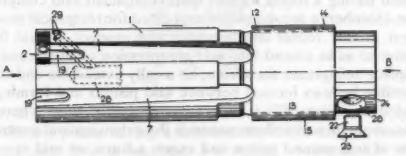
Frederick Gordon Williams, Looe, England, assignor to Toolmasters and Technical Developments (Birmingham) Limited, Birmingham, England

Filed Dec. 2, 1974, Ser. No. 528,913

Claims priority, application United Kingdom, Dec. 8, 1973, 57003/73

Int. Cl.² B23G *77/04*

U.S. Cl. 408—226 **1 Claim**



1. A deep hole boring head comprising a body member arranged to support a boring head at one end and to be attached to a boring bar at the other end, a number of guidance members each comprising a strip of low friction material mounted on a dove-tail cross-section tapered shoe, each shoe being respectively slidable in a dove-tail cross-section slot whose depth increases from one end of the slot to the other, adjustment means arranged to displace the guidance members longitudinally within their slots in order to adjust the radial distances of the guidance members from the centre line of the hole to be bored, and a screw carried by each guidance member and arranged to engage the body member, after each guidance member has been adjusted into the desired position relative to the body member, to prevent friction between the guidance members and the surface of the hole bored by the boring head causing the guidance members to be withdrawn from their slots when the boring head is withdrawn from a hole after a boring operation.

3,998,567

PRESSURE EXCHANGER CELL RING AND IMPROVED CELL WALL CONSTRUCTION THEREFOR

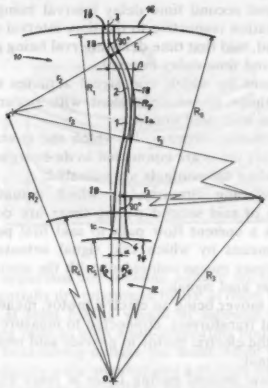
Reinhard Fried, Nussbaumen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed June 26, 1975, Ser. No. 590,685

Claims priority, application Switzerland, July 11, 1974, 9561/74

Int. Cl.² F04D *29/26*

U.S. Cl. 416—189 **14 Claims**



1. A pressure exchanger cell ring comprising a rotor having a hub, a shroud spaced from said hub, cell walls connected with and extending between said hub and shroud, each cell wall possessing at least a double-curved construction defining at least two lobes, each lobe curving to one side of a radius extending from the center of the rotor to one of the points of attachment of the cell wall, the sector angle between two radii extending from the center of the rotor through the points of attachment of the cell wall not exceeding 4°, said cell wall having a mean camber line, said mean camber line being bounded by a sector angle which does not exceed 7°, said value limits of the sector angles serving to essentially compensate the sum of the total stresses appearing in the hub, shroud and cell walls, in order to thereby substantially avoid the presence of any peak stress values.

3,998,568

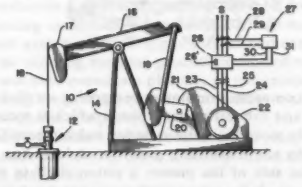
PUMP-OFF CONTROL RESPONSIVE TO TIME CHANGES BETWEEN ROD STRING LOAD

Ike W. Hynd, P.O. Box 93, Midland, Tex. 79701

Filed May 27, 1975, Ser. No. 580,733

Int. Cl.² F04B *49/00*

U.S. Cl. 417—12 **11 Claims**



1. In a prime mover subjected to a cyclic load normally varying between substantially repeated maximum and minimum values on successive cycles of operation and wherein the time intervals of a maximum and minimum load value changes appreciably upon loss of load, the combination with said

prime mover of a pumpoff control device for de-energizing said prime mover upon significant reduction in load thereon; said device having means generating a signal related to the time interval of said maximum and minimum load value; a first pacing timer means having switch contacts associated therewith which are actuated following a first time delay interval upon pacing timer being actuated; a second pacing timer means having switch contacts associated therewith which are actuated following a second time delay interval upon said second pacing timer being actuated; said first and second time delay interval being greater in time duration respective to the time interval of the minimum load, said first time delay interval being greater than said second time delay interval; circuit means by which said signal actuates said second pacing timer means coincident with occurrence of a minimum load time interval; means, including circuitry, by which the contacts of said first pacing timer are connected to de-energize the prime mover when the contacts are actuated; means, including circuitry, by which actuation of the contacts of said second pacing timer are connected to establish a current flow path to said first pacing timer; circuit means by which said signal actuates said first pacing timer means coincident with the occurrence of a maximum load signal; said prime mover being an electric motor; means, including a current transformer, connected to measure the current flow to the electric motor to provide said means generating a signal; whereby said second pacing timer is reset by said signal each cycle of operation only when the duration of the signal is of a smaller time duration than said second time delay interval, and said first pacing timer continues energization of the prime mover only when said time interval of said maximum load value is greater than said first time delay interval.

3,998,569

APPARATUS FOR USE AS A GAS COMPRESSOR OR GAS BLOWER

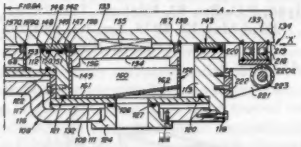
John Maximilian Jules Varga, 2 Lawrence Road, Skircoat Green, Halifax, Yorkshire, England

Continuation of Ser. No. 377,795, July 9, 1973, Pat. No. 3,930,762. This application Nov. 5, 1975, Ser. No. 628,996

Claims priority, application United Kingdom, July 7, 1972, 31968/72

Int. Cl.[2] **F04B** *9/02*; **F16H** *37/16*; **F16C** *19/14*, *31/00*

U.S. Cl. 417—267 **8 Claims**



1. A gas compressor or blower comprising a cylinder having gas intake and exhaust ports; a piston which is rotatably and reciprocably movable in the cylinder; valve means for admitting gas into and exhausting gas from at least one chamber lying to one side of the piston; a piston shaft to which the piston is secured, the piston shaft passing through seals at the axial ends of the cylinder; means for applying a rotary drive to the piston rod; and a cam arrangement for causing reciprocation of the piston rod as this rotates; the arrangement of ports and valve means being such that as the piston rotates and reciprocates gas is induced into the chamber, is compressed in the chamber and then exhausted from the chamber; wherein said cylinder has an end piece at each end thereof; a set of at least three equiangularly spaced follower assemblies is mounted on an axially outer face of each said end piece, and said piston shaft is supported for rotation by two spaced bearing assemblies, one adjacent to each end of said cylinder and supported by a respective set of said follower assemblies such that each said bearing may move axially relative to said follower assemblies.

3,998,570

AIR CONDITIONING COMPRESSOR

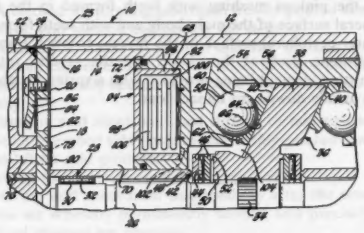
James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 23, 1975, Ser. No. 570,615

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] **F04B** *49/08*

U.S. Cl. 417—274 **2 Claims**



1. A piston type compressor for use in an automotive air conditioning system comprising: a housing having at least one cylinder bore therein and including an end portion overlying the cylinder bore; a first piston supported for reciprocal movement within said cylinder bore and forming in conjunction with said cylinder bore and said end portion a variable volume compression chamber for compressing refrigerant therein; said housing defining a valved inlet to said compression chamber and a valved outlet therefrom to control the flow of refrigerant into and from the compression chamber during an intake stroke and a compression stroke respectively; said first piston having a recess formed therein adjacent said compression chamber; a second piston supported for reciprocal movement in said recess and movable with respect to said first piston so as to extend into said compression chamber and to displace refrigerant therefrom; an axially extendible and contractible bellows located between said pistons and forming a sealed enclosure filled with a compressible fluid whereby movement of said bellows controls the extension and contraction of said second piston and exerts a force on said second position tending to cause it to extend into said compression chamber when the pressure force acting on said second piston from refrigerant within said compression chamber is less than the internal force on said bellows exerted by said fluid.

3,998,571

VALVE RETAINER

Jay F. Falke, Bristol, Tenn., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 14, 1975, Ser. No. 567,535

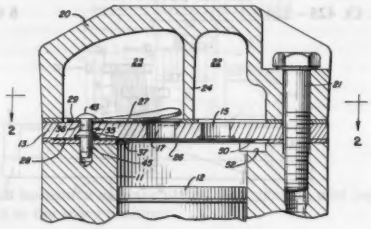
Int. Cl.[2] **F16K** *15/16*; **F04B** *21/02*, *39/10*

U.S. Cl. 417—569 **9 Claims**

1. A flapper valve assembly for suction and discharge ports to a chamber, including: a body having a pressure chamber therein subject to alternate increase and reduction of pressure; a valve plate forming a wall of said chamber and having suction and discharge ports therethrough;

a resilient metal leaf discharge valve overlying the discharge port and having a cantilever mounting portion;

an elongated fastener extending through the mounting portion of the discharge leaf valve and the valve plate, securing the discharge leaf valve to the outer surface of the valve plate, said fastener having a portion projecting inwardly of the valve plate;



a resilient metal leaf suction valve underlying said valve plate and having a cantilever mounting portion with an aperture therein through which said projecting fastener portion extends; and

means locating said valve plate to said body, the mounting portion of the suction leaf valve being held between the valve plate and the body.

3,998,572

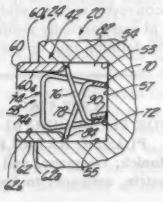
SPACER-SPRING FOR ROTARY PISTON ENGINES

Frank G. Warrick, Muskegon, Mich., assignor to Sealed Power Corporation, Muskegon, Mich.

Filed Nov. 29, 1974, Ser. No. 528,229

Int. Cl.² F01C *19/08*

U.S. Cl. 418—142 **10 Claims**



1. In a rotary piston internal combustion engine of the type in which a piston having a substantially flat axially outwardly facing end face is mounted for orbital reciprocation with respect to an engine housing having a substantially flat axially inwardly facing end wall, an oil seal comprising a circular groove in an end face of said rotor, said groove having opposed radially facing wall surfaces and an axially outwardly facing groove root surface, a first circular oil scraping rail disposed in said groove in proximity to a first of said wall surfaces, and an annular spacer-spring having a pair of concentric circular bands resting upon said groove root surface, a plurality of circumferentially spaced struts connecting said bands and positioning said first rail in proximity to said first wall surface, and a plurality of circumferentially spaced spring legs connected to a one of said bands radially remote form said first rail, and extending generally across said groove to engage said first rail and to urge said rail into sealing engagement with said housing end wall, said bands being formed of continuous lengths of strip material, one of said continuous lengths including a plurality of circumferentially spaced take-up crimps which reduce the effective circumferential length of said continuous length of strip material.

3,998,573

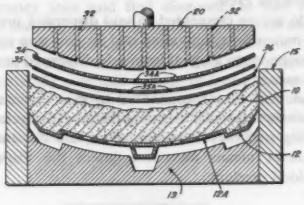
MANUFACTURE OF FRICTION ELEMENTS

Richard H. Gilbert, Ramsey, N.J., and Arvon M. Griffith, Valley Cottage, N.Y., assignors to Abex Corporation, Columbus, Ohio

Continuation of Ser. No. 449,834, March 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 218,313, Jan. 17, 1972, abandoned. This application Oct. 17, 1975, Ser. No. 623,375

Int. Cl.² B29C *27/30*

U.S. Cl. 425—117 **3 Claims**



1. Mold apparatus for pressing vehicle friction elements from an essentially dry mixture of fillers, at room temperature, comprising at least 5% by weight of asbestos fibers and a thermosetting resin to form a self-supporting body suitable for subsequent heat-curing outside the mold, while using a mold cavity bounded by a die member and a plunger member which when mated conform generally to the geometry of the friction element, in which at least one of the members has incorporated therein a plurality of passages leading from the molding cavity to the ambient atmosphere, characterized in that the mold for pressing the mixture is provided with a screen means comprising three elements, the first of which consists of a sheet of expendable paper, in contact with the mixture to be compressed, and the second and third elements of which consist of perforate sheet metal elements which are interposed between the sheet of paper and the member of the mold having the passages, with the sheet metal element contacting the sheet of paper having openings which are smaller than the openings of the other sheet metal member contacting the member of the mold equipped with the passages.

3,998,574

PROCESSED-PACED, FLUIDIC CONTROL SYSTEM FOR MOLDING MACHINES

Frederick H. Blake, 226 W. Edith Ave., No. 28, Los Altos, Calif. 94022

Continuation of Ser. No. 438,580, Feb. 1, 1975, abandoned. This application Oct. 3, 1975, Ser. No. 619,442

Int. Cl.² B29F *1/14*

U.S. Cl. 425—137 **5 Claims**

1. In a molding machine and control system for manufacturing molded food products wherein the molding machine forms a food product in a mold and dispenses the food product from the dispensing section of the molding machine and wherein the control system controls a plurality of sequential process steps in the molding machine process cycle, and wherein the molding machine contains a plurality of pneumatic actuators for powering the process steps in the process cycle, wherein the improvement comprises:

a plurality of sensor means connected to said pneumatic actuators for sensing the actuation position of said pneumatic actuators,

at least one of said pneumatic actuators comprising a piston and cylinder combination,

said process sensor means associated with said piston and cylinder combination comprises a cylinder stroke sensor means in pneumatic communication with said cylinder for producing a fluidic output under the influence of said

piston substantially completing a stroke in said piston and cylinder combination,

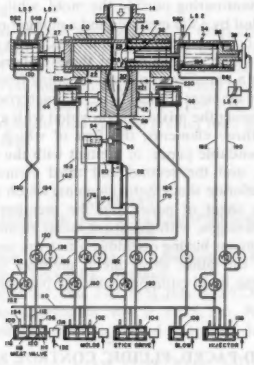
process step control means connected to said plurality of sensor means for sequentially controlling succeeding process steps in response to signals from the individual one of said sensor means that is connected to the particular pneumatic actuator utilized in the proceeding step,

start-stop means connected to said process step control means for initiating a process cycle,

dispensed product detector means in association with the dispensing section of said molding machine for detecting the dispensing of the molded product at the completion of a process cycle,

recycle means connected to said dispensed product detector means for reactivating said process step control means in response to a signal from said dispensed product detector means,

malfunction means connected to said dispensed product detector means for stopping the process cycle and deactivating said recycle means when said dispensed product detector means does not detect the dispensing of a molded product.



5. A process-paced fluidic control system for a molding machine that dispenses a molded product from a dispensing section of the machine comprising:

a plurality of piston and cylinder combinations for actuating sequential process steps,

a plurality of piston stroke sensor means in pneumatic communication with said piston and cylinder combinations for producing a signal under the influence of the piston having substantially completed a stroke in said piston and cylinder combination,

process step control means connected to said piston stroke sensor means for controlling said piston and cylinder combinations,

said process step control means comprising fluidic logic means for initiating a sequential process step after a signal from a selected one of said piston stroke sensor means,

and cylinder control means connected to said process step control means for delivering pressure to said piston and cylinder combinations when commanded by said logic means.

3,998,575

CONTINUOUS PRODUCTION OF POLYMERIC FOAM

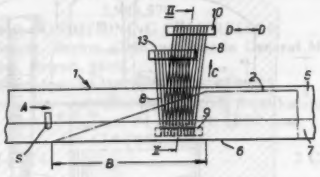
Nicholas Cornelis Vreenegoor, Hillegom, Netherlands, assignor to Unifoam AG, Glarus, Switzerland

Division of Ser. No. 478,510, June 12, 1974, Pat. No. 3,965,228. This application Aug. 13, 1975, Ser. No. 604,153

Claims priority, application United Kingdom, June 18, 1973, 28884/73

Int. Cl.² B29D *27/04*

U.S. Cl. 425—224 **8 Claims**



1. Apparatus for continuously producing flat-topped polymeric foam, comprising

a. longitudinally displaceable generally horizontal open-topped trough conveyor means (6, 7);

b. means (S) adjacent said trough conveyor means for depositing a foamable mixture therein, thereby to permit foaming and expansion of the mixture in a foaming region (B) extending longitudinally of said trough conveyor means; and

c. lifting means contained solely in said foaming region for lifting each of the side portions of the mixture during the expansion thereof to cause the foam emerging from the foaming region to have a flat top surface, said lifting means including at each side of the trough conveyor means a plurality of continuously driven endless wire means (8) having upwardly travelling runs (8*a*) contained in a vertical plane adjacent one side and parallel with the longitudinal axis of said trough conveyor means, and primary guide means (9) arranged adjacent the bottom of said trough conveyor means, said endless wire means being guided at least partially around said primary guide means prior to defining said upwardly travelling runs.

3,998,576

MACHINE FOR PRODUCING BLOWN HOLLOW PLASTIC ARTICLES

Walter Frohn, Munich, Germany, and Heinrich Rothbauer, Altmunster, Austria, assignors to Incoplan GmbH, Chur, Switzerland

Filed Nov. 13, 1973, Ser. No. 415,863

Claims priority, application Germany, Nov. 13, 1972, 2255536

Int. Cl.² B29D *23/03*

U.S. Cl. 425—326 B **16 Claims**

1. In a blow-molding machine for producing hollow plastic articles the improvement comprising:

a stationary extruder head;

a pair of inclined guides symmetrically arranged with respect to a vertical plane passing through said extruder head and ascending towards said extruder head;

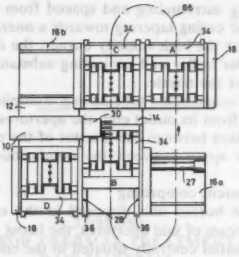
at least one blow mold closing unit operatively slidably supported on each of said inclined guides;

means operatively associated with said units for moving each of said units along said inclined guides;

said blow mold closing units comprise a pair of spaced-apart closing plates adapted to move toward each other and to carry mold halves;

a sizing device disposed on each blow mold closing unit, said sizing device having a horizontal carriage mounted on one of said closing plates for movement in the direction of closing, and a vertical carriage mounted movably

thereon, indexing pins secured to said horizontal carriage to engage corresponding indexing holes in the other of



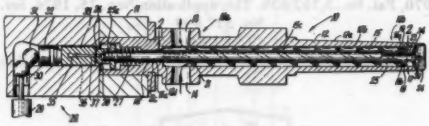
said horizontal carriage plates, said indexing pins engaging in the sizing position.

3,998,577

TEMPERATURE CONTROLLED CORE ROD

John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.

Filed Oct. 31, 1975, Ser. No. 627,608
Int. Cl.² B29C *17/07*
U.S. Cl. 425—387 B 8 Claims



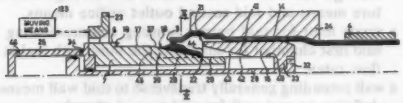
1. A core rod for an injection blow molding machine comprising an outer tubular member for receiving a parison having one end for mounting to the molding machine and the other end being the free end, a blow air inlet valve being mounted at the free end, an inner tubular member, the outside of said inner tubular member and the inside of said outer tubular member forming an annular passage for the flow of a temperature control fluid and an axially disposed tubular air conduit slidably disposed in said inner tubular member, said air conduit being connected to said valve for movement therewith, and further comprising means to move said conduit in the axial direction so as to form a blow air opening between said valve and the free end of the tubular member.

3,998,578

MANDRIL FOR SHAPING A BELL END ON A PIPE OF THERMO-PLASTIC MATERIAL

Petrus Marinus Acda, Enkhuizen, Netherlands, assignor to Polva-Nederland B.V., Enkhuizen, Netherlands

Continuation of Ser. No. 408,562, Oct. 23, 1973, abandoned. This application May 28, 1975, Ser. No. 581,707
Claims priority, application Netherlands, Apr. 5, 1973, 7304761
Int. Cl.² B29C *17/00*
U.S. Cl. 425—393 6 Claims



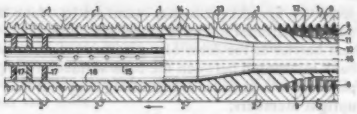
1. A mandril assembly for shaping a radially enlarged interior region in a tubular material, comprising a base part, a shaping ring, a sleeve part and means for causing relative movement between the said base part and said sleeve part into operative and removal positions, said base part having at least a first surface having a first diameter less than an inside dimeter of said enlarged region, and a surface of lesser diameter than said first surface, said shaping ring being elastically stretchable and slidably mounted for axial movement on at least said surface of lesser diameter on said base part, said sleeve being coaxial with said base part and having an outer diameter at the most equal to said first diameter, in said operative position said shaping ring positioned on a surface of said base part such that an outer surface of the shaping ring has a diameter greater than said first diameter, in said removal position said shaping ring being axially moved with respect to said base part into a clearance between said surface of lesser diameter and said sleeve part such that said shaping ring contracts elastically over said surface of lesser diameter so as to have a maximum diameter less than said first diameter, whereby said mandril can be removed from the tubular material without disassembly after formation of the radially enlarged region.

3,998,579

DEVICE FOR PRODUCING EXTERNALLY RIBBED PIPES OF PLASTIC

Erik Gustav Wendel Nordstrom, Box 84, 840 20 Ange, Sweden

Filed Oct. 17, 1974, Ser. No. 515,568
Claims priority, application Sweden, Oct. 22, 1973, 7314295
Int. Cl.² B29D *23/04*, *23/18*
U.S. Cl. 425—393 16 Claims



1. A forming device for producing gilled pipes of extrudable material received from an extruder, said forming device comprising, a nozzle sleeve coupled to said extruder, a mandrel disposed in said nozzle sleeve and extending substantially therebeyond and defining therewith a tubular channel having an axially oriented orifice to enable passage of the extrudable material therepast, plural pairs of mould jaw halves arranged for transportation in an endless series, each mould jaw half having generally annular groove means formed in the inner wall surface thereof, guiding rail means coaxial with said nozzle sleeve and guiding said mould jaw halves so that they are brought together at the nozzle sleeve and at the mandrel, and that they separate after passing a distance coupled together to define a forming zone, said nozzle sleeve being coaxial with said mould jaw halves and being spaced inwardly from the inner walls thereof, and means forcing the extrudable material into a plurality of the grooves of said groove means within the forming zone substantially to fill same simultaneously with the formation of a smooth interior wall surface, said forcing means comprising an enlarged diameter head formed on the mandrel coaxial therewith and spaced from said orifice when said mandrel is within said forming zone, said head having a cylindrical, smooth surface external configuration for forming said interior wall surface and said mandrel having a conical portion integral and coaxial with said head and mandrel located adjacent said head, the generatrix of said conical portion forming an angle of less then 45° with the axis of said conical portion and mandrel, the distance along said mandrel from said orifice to said head being about four to five times the mandrel diameter at said orifice.

3,998,580

PRESS SPAR FOR HEATED PANEL PRESS

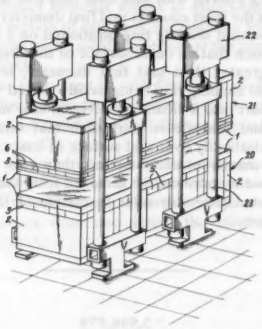
Heinrich Pfliffer, Eppingen, Germany, assignor to Maschinenfabrik J. Dieffenbacher & Co., Eppingen, Germany

Filed July 8, 1974, Ser. No. 486,375

Claims priority, application Germany, July 6, 1973, 2334450

Int. Cl.[2] B29C *3/00*

U.S. Cl. 425—407 16 Claims



1. In a heated panel press for the production of pressed, composite panels such as chipboard panels, fiber panels and the like, in which the work is pressed between opposing, heatable and coolable horizontal pressure plates which are mounted on upper and lower press spars, respectively, of which at least one is vertically movable, wherein the improvement pertains to the structure of the press spars and comprises:

at least two upright press spar members to which the associated horizontal pressure plates are connected;

a heat barrier in the form of a pressure-resistant insulating bank interposed between the back surface of the pressure plate and the pressure-transmitting near end face of each upright members;

upper and lower metallic shroud members encasing each insulating bank in such a way that such relative horizontal displacements between the upright members and the pressure plate as are generated by non-uniform thermal expansion of the press spar structure elements during operation take place between the upright members and the contacting shroud members, on the one hand, and between the pressure plate and the shroud members in contact with the pressure plate, on the other hand.

3,998,581

GASEOUS FUEL BURNERS

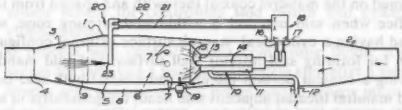
Maurice Hemingway, Mirfield, and Trevor Ward, Dewsbury, both of England, assignors to Hotwork International Limited, England

Filed May 12, 1975, Ser. No. 576,264

Claims priority, application United Kingdom, May 14, 1974, 2174/74

Int. Cl.[2] F23R *1/10*

U.S. Cl. 431—158 3 Claims



1. In a gaseous high velocity burner of the type having

a. an elongate combustion tube,

b. a main burner unit at the inlet end of the combustion tube,

c. means for supplying fuel and compressed air to the main burner unit,

d. a casing surrounding and spaced from the combustion tube, the casing tapering towards a nozzle serving as the outlet for the high velocity burner, the combustion tube having its outler end projecting substantially to the entrance of the nozzle,

e. and the combustion tube having multiplicity of apertures remote from its outlet end, the apertures providing communication between the interior of the combustion tube and the space between the combustion tube and the casing,

the improvement comprising

1. a boost burner unit disposed in the combustion tube downstream of said apertures, the boost burner unit having its outlet centrally situated in the combustion tube,

2. and means for supplying fuel and compressed air to the boost burner unit whereby a fuel enriched output is emitted from the combustion tube that sustains further combustion beyond the outlet end of the combustion tube.

3,998,582

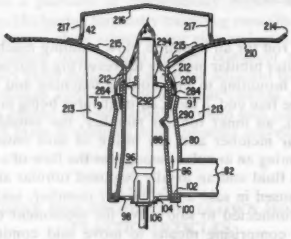
GASEOUS FUEL BURNER SYSTEM

Jay R. Katchka, Long Beach, and Henry C. Braucksiek, Buena Park, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 392,403, Aug. 28, 1973, Pat. No. 3,850,370, which is a division of Ser. No. 98,246, Dec. 15, 1970, Pat. No. 3,762,639. This application Nov. 25, 1974, Ser. No. 527,099

Int. Cl.[2] F23D *13/36*

U.S. Cl. 431—349 4 Claims



1. A dual rate burner comprising a burner housing having first and second outlet orifice means,

wall means in said housing separating the same into first and second chamber,

said first outlet orifice means leading from said first chamber and said second outlet orifice means leading from said second chamber,

aperture means in said wall means establishing communication between said first and second chamber,

said aperture means defining a cross-sectional flow area substantially smaller than a cross-sectional flow area defined by said first outlet orifice means whereby a low fuel pressure in said first chamber causes a fuel flow through said first outlet orifice means and whereby a high fuel pressure in said first chamber causes a fuel flow through said outlet orifice means and through said aperture means and said second outlet orifice means,

a single inlet for said burner housing communicating with said first chamber for supplying the same with fuel at dual flow rates,

a wall extending generally transverse to said wall means and defining an end wall for said second chamber,

said second outlet orifice means being located in said end wall, and

said second chamber having air intake means in an end portion opposite to said end wall to define an air-fuel mixing chamber upstream of said second outlet orifice means.

3,998,583

APPARATUS FOR THERMAL TREATMENT OF MOIST RAW MATERIAL

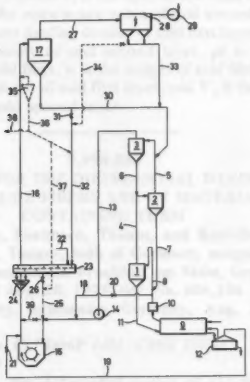
Jakob Hinterkeuser, St. Augustin, and Andris Abelitis, Hoffnungsthal, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Aug. 20, 1975, Ser. No. 606,194

Claims priority, application Germany, Aug. 21, 1974, 2440053

Int. Cl.² F27B *15/00*; F26B *17/00*

U.S. Cl. 432—14 **9 Claims**



9. The method of thermally treating wet raw pulverulent material for cement which comprises feeding the wet material into a rising column of hot gases, blowing the hot gases into the bottom of the column to draw the wet material into the rising stream, controlling the blowing of the hot gases into the column to accommodate falling of coarse pulverulent material in the column, comminuting the coarse material, and reintroducing the comminuted material back into the column.

3,998,584

ELECTROPHOTOGRAPHIC FUSING APPARATUS

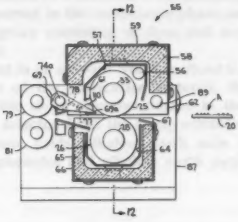
Kenichi Wada, Sakai; Yuji Enoguchi, Higashiosaka; Masaya Ogawa, Sakai; Hidetoshi Kawabata, Tondabayashi; Takaji Kurita, Kawachinagano; Susumu Tanaka, Sakai; Takao Fujiwara, Sakai, and Hiroshi Murasaki, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed June 10, 1975, Ser. No. 585,709

Claims priority, application Japan, June 17, 1974, 49-69522; June 15, 1974, 49-68285

Int. Cl.² H05B *3/10*; G03G *5/00*

U.S. Cl. 432—60 **6 Claims**



1. A fusing apparatus for an electrophotographic copying machine, comprising:

a pair of rotatably mounted rolls comprising a heat roll and a support roll between which a support sheet bearing a toner powder image may pass, the axes of said rolls being spaced apart a first distance while one of said rolls bears against the other of said rolls under its own weight;

means supporting said one roll for movement thereof toward said other roll so that said roll axes may be spaced apart a second distance less than said first distance;

a heat source for heating said heat roll to a level suitable for fusing the toner image on the support sheet;

means for rotating said rolls;

means detecting arrival and departure of the support sheet from said rolls;

a pressing means actuated by said detecting means upon the arrival of the support sheet and de-actuated by said detecting means upon the departure of the support sheet;

said rotating means being coupled with said supporting means by said pressing means, when actuated, for moving said one roll toward said other roll so that said roll axes are spaced apart said second distance;

whereby said rolls are rotated in bearing contact at a first predetermined pressure while said roll axes are spaced said second distance apart upon the arrival of the support sheet, and said rolls are rotated in bearing contact at a second predetermined pressure less than said first pressure while said roll axes are spaced said first distance apart upon the departure of the support sheet.

3,998,585

PACKAGE DYEING METHOD

Shinji Tomibe; Michio Arai, and Kiyoshi Higashi, all of Kyoto, Japan, assignors to Kuraray Co., Ltd. and Nippon Sanmo Sensyoku Co., Ltd., both of, Japan

Filed July 3, 1975, Ser. No. 592,988
Claims priority, application Japan, July 18, 1974, 49-82475
Int. Cl.² D06P 7/00; D06B 5/00
U.S. Cl. 8—19 16 Claims

1. A package dyeing method which comprises:
a. charging a loose stock of fiber into a basket carrier of a high temperature, high pressure package dyeing machine,
b. compressing said fiber to form a first fiber layer in such a manner that ϵ_1, defined as $1-\rho_{f1}/\rho f$ where ρ_{f1} is equal to W/V_1, is within the range of 0.47 and 0.85,
c. circulating a dyeing liquid through said first layer,
d. removing the excess dyeing liquid from said carrier to thereby obtain a second fiber layer having a value for ϵ_2, defined as $1-\rho_{f2}/\rho f$ where ρ_{f2} is equal to w/v_2, such that (a), defined as

$$\frac{\epsilon_1 - \epsilon_2}{\epsilon_1} \times 100,$$

has a value of 10% or less,
e. washing and rinsing said second layer while in said basket carrier, and wherein ϵ_1 is the open space value of said first layer, ϵ_2 is the open space value of said second layer, ρ_{f1} is the apparent loading density of said first layer, ρ_{f2} is the apparent density of said second layer, ρf is the actual density of said fiber, w is the weight of said fiber, v_1 is the apparent volume of said first layer, and V_2 is the apparent volume of said second layer.

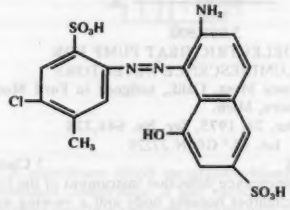
3,998,586

PROCESS FOR THE DIFFERENTIAL DYEING OF POLYAMIDE FIBERS AND OF MATERIALS CONTAINING THEM

Ludwig Schläfer, Fischbach, Taunus, and Karl-Heinz Flemmig, Hofheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 20, 1975, Ser. No. 606,106
Claims priority, application Germany, Aug. 22, 1974, 2440208
Int. Cl.² D06P 3/82; C09B 29/30
U.S. Cl. 8—21 B 1 Claim

1. Process for the differential dyeing of (1) mixtures of natural or synthetic or natural and snythetic fiber materials of polyamides having polyamide fibers which can be dyed in different depths of shade, or (2) of mixtures of polyamide fibers which can be dyed in different depths of shade, with other natural or synthetic fibers, which comprises
a. dyeing the said fiber materials at a temperature of from 60° to 150° C with an aqueous solution containing the red monoazo dyestuff of the formula



(I), or

b. padding the said fiber materials at a temperature of from 20° to 60° C with a dye paste containing the above-mentioned dyestuff and subsequently steaming them at a temperature of from 100° to 150° C.

3,998,587

TEXTILE TREATING DISPERSION CONCENTRATE

Haroid L. Jackson, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,562
Int. Cl.² D06P 5/04
U.S. Cl. 8—169 10 Claims

1. Stable concentrate dispersion comprising
a. a continuous phase consisting of an inert, organic normally liquid or solid material having a solubility parameter of no greater than 9.2, a hydrogen bonding parameter of no greater than 1.5 and solubility in 1,1,2-trichloro-1,2,2-trifluoroethane of at least 0.99 weight % at 25° C.;
b. a normally solid particulate material which has a maximum dimension of 5 microns, is substantially insoluble in and is dispersed in the continuous phase and is selected from the group consisting of dyes and textile finishing agents; and
c. a dispersant in an amount which is about 0.25–4.0 times the weight of the particulate material, the dispersant being soluble to an effective degree in the continuous phase and selected from the group consisting of C_{18}–C_{20} of polytitanic acids, alkaline earth salts of sulfurized alkylated phenates and alkaline earth petroleum sulfonates.

3,998,588

PROCESS FOR CONTINUOUSLY TRANSFERRING HEAT TO A MOVING BAND

George R. Coraor, Wilmington; Harold L. Jackson, Hockessin, and Frederick W. Mader, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,568
Int. Cl.² D06P 3/00, 5/00
U.S. Cl. 8—176 13 Claims

1. Process for rapidly and efficiently transferring heat to a moving band of solid material with minimum energy expenditure and freedom from environmental pollution, which process comprises:
a. passing the band through a substantially enclosed purging-drying region through which the superheated condensable vapor of a water-immiscible liquid having an atmospheric pressure boiling point of greater than 20° C. but less than about 120° C. is substantially concurrently passed to dry the band and/or purge noncondensable gas from the band;
b. immediately passing the band from (a) through a substantially enclosed heat transfer region containing circulating superheated condensable vapor of a fluorocarbon having a fluorine to carbon atom ratio of at least 1.5, a solubility parameter of not more than 6.5, a molecular weight of at least 300 and a circulation driving force of greater than 5.1 cm. of water, to effect the desired heat transfer, the heat transfer region being substantially free of noncondensable gas and at a pressure no greater than that in the purging-drying region;
c. immediately passing the band from (b) through a substantially enclosed purging region through which dry steam is substantially concurrently passed to purge fluorocarbon vapor from the band, the purging region being substantially free of noncondensable gas and at a pressure which is no less than that in the heat transfer region;
d. passing the band, substantially free of fluorocarbon, out of the purging region and recovering the band; and
e. recovering and recycling fluorocarbon from the heat transfer and purging regions.

3,998,589

METHOD OF ASEPTICALLY SEALING A STORAGE TANK

Steve A. Rechtsteiner, 1920 Gainsborough Lane, Cincinnati, Ohio 45230; Philip E. Nelson, 911 Garden St., and John R. Heron, 1016 Lindberg Road, both of West Lafayette, Ind. 47906

Division of Ser. No. 496,654, Aug. 12, 1974, Pat. No. 3,951,184. This application July 22, 1975, Ser. No. 598,049
Int. Cl.² A61L 1/00; F16K 51/02
U.S. Cl. 21—58 3 Claims

1. A method of aseptically sealing an aseptic storage tank containing sterile product comprising the steps of:

connecting first and second aseptic valves in series with an opening in the tank,

closing the first valve to seal the valve-closure cavity of the first valve from the tank opening to which a first port of the first valve communicates when the first valve is open,

introducing liquid chemical sterilant into the valve-closure cavities of the first and second valves to sterilize and establish first and second aseptic barriers between the tank opening and the environment, and

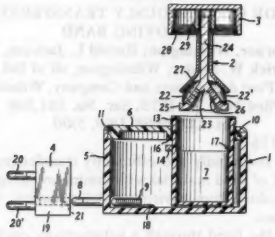
closing the second valve to seal the valve-closure cavity from the first valve-closure.

3,998,590

APPARATUS FOR ASEPTICIZING CONTACT LENS

Gilbert Glorieux, 72, rue Achille Viadieu, 31400 Toulouse, France

Filed Jan. 20, 1975, Ser. No. 542,679
Claims priority, application France, Feb. 1, 1974, 74.04041
Int. Cl.² A61L 3/00
U.S. Cl. 21—89 5 Claims



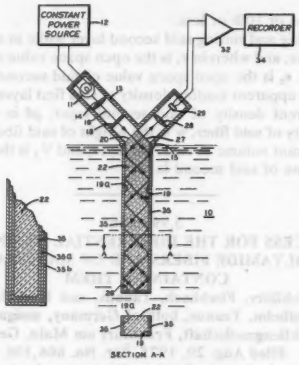
1. A portable, compact sterilization device for sterilizing contact lenses comprising, a single cell made of an electrically insulative material and having a bottom as a base and a single cylindrical sidewall upstanding on said bottom defining the interior of said cell, a liquid-tight container having a single cylindrical sidewall and an open neck for receiving therethrough an aseptic izing liquid and for providing access into the interior of said container, a removable cover on said cell closing said cell in a fluid-tight manner having at least one opening for introducing a metered volume of an electrically conductive liquid into said cell and to allow vapor to escape therefrom, said cover for said cell further having an opening through which the neck of said container snugly extends, a removable lens-holder insertable into said container through said neck, said lens-holder having means for removably holding a pair of contact lens thereon to be aseptic ized and an upstanding grip extending out of said neck for inserting the lens-holder into said container and for removing it therefrom, said neck having an external thread, and internally threaded removable cover for threading on to said neck selectively for closing said container in a liquid-tight manner, said container cover having a central region for receiving said grip axially therein and bearing thereon for holding said lens-holder centered and axially seated in said container, a pair of electrical male plug connectors extending outwardly of said cell and spaced for plugging into a standard electrical wall outlet with said sidewall thereof upstanding and the cell and container therein being unsupportd in use otherwise than by said male plug connectors, a pair of spaced electrodes internally of said cell each electrically connected to a respective one of said plug connectors, protective fin means extending from said container having surfaces internally of said cell spaced from and in registry with said opening in said cover to conceal the electrodes and preclude manual insertion of an article into said cell with subsequent contact with said electrodes, and said container being disposed vertically and removable jointly with the cell cover for access into the interior of said cell for selectively cleaning the interior of said cell thoroughly.

3,998,591

SPECTROCHEMICAL ANALYZER USING SURFACE-BOUND COLOR REAGENTS

Edgar Lawrence Eckfeldt, Ambler, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Sept. 26, 1975, Ser. No. 617,265
Int. Cl.² G01N 21/48, 31/22; G02B 5/12
U.S. Cl. 23—253 R 11 Claims



1. A spectrochemical analyzer comprising;

a light conductor with a portion of its surface coated with a color reagent responsive to change the light absorption quality of said reagent in accordance with the magnitude of a specific chemical condition of a sample in contact with said surface,

means for directing light through said conductor so that multiple internal reflections occur at the coated portion of the surface, and

means for detecting changes in the intensity of the light transmitted by said light conductor in response to changes in the light absorption quality at said coated surface due to changes in said chemical condition.

3,998,592

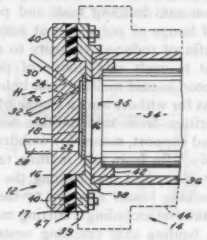
THERMOELECTRIC HEAT PUMP FOR CHEMILUMINESCENCE DETECTORS

William I. Pyle, Costa Mesa, Calif., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 24, 1975, Ser. No. 644,224
Int. Cl.² G01N 21/26
U.S. Cl. 23—254 E 3 Claims

1. In a chemiluminescence detection instrument of the type having a reaction chamber housing body and a viewing window cooperative therewith to define a reaction space and a light sensing instrument portion including a light sensing instrument positioned to receive any chemiluminescence produced in the reaction space and transmitted through the viewing window, the improvement comprising:

thermoelectric heat pump means having at least one cooled surface and at least one heated surface situated intermediate the reaction chamber housing body and the light sensing instrument portion and having said cooled surface



in thermal energy exchange contact with the light sensing instrument portion and said heated surface in thermal energy exchange contact with the reaction chamber housing body.

3,998,593

MEMBRANE BLOOD OXYGENATOR

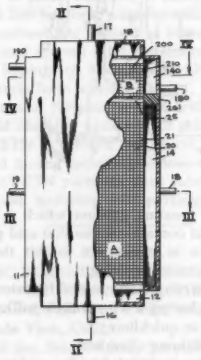
Fumitake Yoshida, and Shigeo Kato, both of Kyoto, Japan, assignors to Seisan Kaihatsu Kagaku Kenkyusho, Kyoto, Japan

Continuation-in-part of Ser. No. 485,151, July 1, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,407

Claims priority, application Japan, July 2, 1973, 48-75134; May 10, 1974, 49-52553

Int. Cl.[2] A61M *1/03*

U.S. Cl. 23—258.5 MH 4 Claims



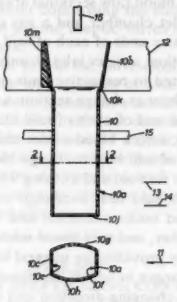
1. A membrane blood oxygenator-blood heat exchanger combination comprising: a gas exchange section having a multi-layer structure consisting of alternate layers of rectangular polymer membranes and rectangular mesh spacers forming alternate gas channels and gas exchange blood channels between said membranes, said gas channels being sealed from said blood channels, said gas channels and said blood channels being perpendicular to each other with respect to the directions of gas flow and blood flow, a heat exchange section having a multi-layer structure consisting of alternate layers of metal sheets and rectangular mesh spacers forming alternate heat exchange blood channels and water channels between said metal sheets, said heat exchange blood channels and said water channels being perpendicular to each other with respect to the directions of blood flow and water flow, said heat exchange blood channels being sealed from said water channels, each of said heat exchange blood channels being aligned with and forming an extension of a respective each of said gas exchange blood channels and having a blood flow sectional area equal to the blood flow sectional area of the gas exchange section; a gas inlet chamber and a gas outlet chamber connected to respective ends of each of said gas channels of said gas exchange section; a water inlet chamber and a water outlet chamber connected to respective ends of each of said water channels of said heat exchange section; a blood inlet chamber connected to one end of each of said blood channels of said gas exchange section; a blood outlet chamber connected to one end of each of said heat exchange blood channels of said heating exchange section; and a casing which contains said gas exchange section, said heat exchange section, said gas inlet chamber and said outlet chamber, said water inlet chamber and outlet chamber, and said blood inlet chamber and outlet chamber, thereby providing an integral blood oxygenator and blood heat exchanger in which the blood flows at a constant velocity without changing direction and in series through the oxygenator and heat exchanger with gas on both sides of the blood channels as the blood flows through the gas exchange section and water on both sides of the blood channels as the blood flows through the heat exchange section.

3. A membrane blood oxygenator-blood heat exchanger combination comprising: a gas exchange section having a multi-layer structure consisting of alternate layers of rectangular polymer membranes and rectangular mesh spacers forming alternate gas channels and gas exchange blood channels between said membranes, said gas channels being sealed from said blood channels, said gas channels and said blood channels being perpendicular to each other with respect to the direction of gas flow and blood flow, a heat exchange section having a multi-layer structure consisting of alternate layers of rectangular mesh spacers and flattened metal tubes, said flattened tubes forming water channels, and the space outside and between flattened tubes forming heat exchange blood channels, said heat exchange blood channels and said water channels being perpendicular to each other with respect to the directions of blood flow and water flow, said heat exchange blood channels being sealed from said water channels, each of said heat exchange blood channels being aligned with and forming an extension of a respective each of said gas exchange blood channels and having a blood flow sectional area equal to the blood flow sectional area of the gas exchange section; a gas inlet chamber and a gas outlet chamber connected to respective ends of each of said gas channels of said gas exchange section; a water inlet chamber and water outlet chamber connected to respective ends of each of said water channels of said heat exchange section; a blood inlet chamber connected to one end of each of said blood channels of said gas exchange section; a blood outlet chamber connected to one end of each of said heat exchange blood channels of said heat exchange section; and a casing which contains said gas exchange section, said heat exchange section, said gas inlet chamber and said outlet chamber, said water inlet chamber and outlet chamber, and said blood inlet chamber and outlet chamber, thereby providing an integral blood oxygenator and blood heat exchanger in which the blood flows at a constant velocity without changing direction and in series through the oxygenator and heat exchanger with gas on both sides of the blood channels as the blood flows through the gas exchange section and water on both sides of the blood channels as the blood flows through the heat exchange section.

3,998,594
CUVETTE FOR AUTOMATIC CHEMICAL TESTING APPARATUS

Thomas Horne, Leighton Buzzard, England, assignor to Coulter Electronics, Inc.

Filed Nov. 26, 1975, Ser. No. 635,438
Claims priority, application United Kingdom, Oct. 3, 1975, 40673/75
Int. Cl.² G01N *33/16, 1/10, 23/10*
U.S. Cl. 23—259 **13 Claims**

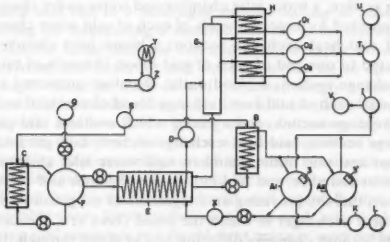


1. A cuvette for use with absorbance measuring apparatus adapted to transmit a beam of radiant energy through the cuvette and comprising an integral molded article of transparent synthetic resin and being formed of an upper sample receiving part and a lower liquid retaining part, the lower liquid retaining part having a uniform cross section in a horizontal plane which is generally oval but with the ends flattened, the flattened ends being parallel and forming flat planar walls connected by outwardly convex walls, the distance between the interior faces of the flat planar walls being substantially greater than the distance between the inner surfaces of the convex walls measured at their centers and said lower part having the same configuration along a substantial portion of its vertical extent.

3,998,595
APPARATUS FOR MELTING AND CRACKING AMORPHOUS POLYOLEFIN

Katsutoshi Oshima, No. 2-31, Tokiwadai, Itabashiku, Tokyo, Japan

Division of Ser. No. 434,460, Jan. 18, 1974, Pat. No. 3,956,414. This application Dec. 8, 1975, Ser. No. 638,498
Claims priority, application Japan, Sept. 6, 1973, 48-99709
Int. Cl.² B01J *1/00;* **C07C** *3/26*
U.S. Cl. 23—262 **6 Claims**

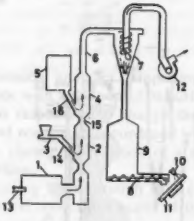


1. Apparatus for melting and thermally cracking a solid, amorphous polyolefin material comprising, holding tank means adapted to hold a melted body of amorphous polyolefin material for an extended period of time, heating means for said holding tank operatively associated with said holding tank and adapted to heat said melted body of polyolefin material and reduce the viscosity thereof, melting tank means including a perforated support means disposed at an intermediate point in said melting tank and adapted to maintain a bed of lumps of solid amorphous polyolefin material, supply means adapted to withdraw at least a portion of said melted polyolefin of reduced viscosity from said holding tank and pass the same through said bed of lumps of polyolefin at a weight ratio of said melted polyolefin of reduced viscosity to said lumps of polyolefin sufficient to melt said lumps of polyolefin and stirring means disposed in said melting tank below said perforated support, means for withdrawing a sludge phase, containing unmelted impurities, from said melting tank at a point below said perforated support, means for withdrawing a liquid phase of melted polyolefin from said melting tank at a point below said perforated support and passing the same to said holding tank, a cracking vessel adapted to thermally crack melted polyolefin material including a stirring means disposed therein, means for heating said cracking vessel, means for withdrawing a portion of said melted polyolefin from said holding tank and passing the same to said cracking vessel and means for recovering a liquid oil product from said effluent from said cracking vessel.

3,998,596
APPARATUS FOR TREATING BY-PRODUCT GYPSUM TO BE USED AS AN INHIBITOR FOR SETTING OF CEMENT

Yoshiharu Fukuda, Tokyo; Toshio Onishi, Koshigaya, and Akitoshi Takeuchi, Yokohama, all of Japan, assignors to Onoda Cement Company, Ltd., Japan

Division of Ser. No. 366,402, June 4, 1973, Pat. No. 3,928,053. This application Aug. 8, 1975, Ser. No. 602,927
Int. Cl.² B01J *1/00;* **C04B** *11/02*
U.S. Cl. 23—262 **3 Claims**



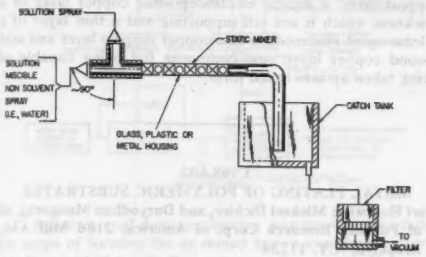
1. Apparatus for treating gypsum which is contaminated with phosphoric acid contaminant so that said gypsum can be used as an additive in cement to inhibit the setting rate thereof, said apparatus comprising:

a. means for dispersing comminuted limestone in a stream of gas, said gas having a temperature sufficient to calcine said limestone to quicklime;
b. an elongate calcining chamber;
c. means for continuously introducing said stream of hot gas containing said quicklime to one end of said calcining chamber;
d. means for continuously introducing said gypsum in comminuted form to said one end of said calcining chamber and for dispersing said gypsum in said stream of hot gas to calcine said gypsum;
e. means for continuously withdrawing a gaseous dispersion containing quicklime and calcined gypsum from the other end of said calcining chamber;
f. a gas-solids separator for separating the calcined gypsum and quicklime from said dispersion; and
g. means for hydrating the quicklime and gypsum.

3,998,597
APPARATUS FOR MANUFACTURE OF SENSITIZED FINE PARTICLE PENETAERYTHRITOL TETRANITRATE

Charles D. Forrest, Hollister, Calif., assignor to Teledyne McCormick Selph, Hollister, Calif.

Division of Ser. No. 434,753, Jan. 18, 1974. This application Feb. 25, 1974, Ser. No. 445,692
Int. Cl.² C06B 21/00
U.S. Cl. 23—266 6 Claims



1. Apparatus operable for making sensitized fine particle penetaerythritol tetranitrate (PETN) comprising:

A. first mixing means operable for dissolving PETN in solvent to form a solution at a temperature not exceeding the solvent boiling point said first means including an outlet for said solution;

B. second means operable for intermingling the PETN solution with a miscible non-solvent in the form of fine sprays said second means comprising a main chamber, a first inlet chamber in flow connection with a source of a miscible non-solvent, wherein said first and second inlet chambers are uniform diameter right circular cylinders that, at one end, open into said main chamber to define an included angle, between the centerlines of said inlet chambers, of substantially 90° and each inlet chamber further includes, at its other end, nozzle means operable to form sprays, wherein the average spray droplet size expressed in mean diameter is between about 1 micron and about 200 microns, whereby said PETN solution and said non-solvent are formed as respective sprays within said first and second inlet chambers and thereafter directed to impinge on each other within said main chamber to therein form a mixed stream;

C. third means in flow connection with the mixed stream efflux from said chamber operable for collecting and filtering precipitated PETN to remove free liquid; and

D. said third means including further means operable for drying the PETN particles until substantially free of included liquid, including inter-particle liquid.

3,998,598
AUTOMATIC DIAMETER CONTROL FOR CRYSTAL GROWING FACILITIES

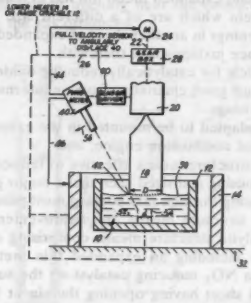
Anthony C. Bonora, Palo Alto, Calif., assignor to Semimetals, Inc., Mountain View, Calif.

Continuation of Ser. No. 418,392, Nov. 23, 1973, abandoned. This application Feb. 7, 1974, Ser. No. 440,592
Int. Cl.² B01D 9/00; B01J 17/18
U.S. Cl. 23—273 SP 11 Claims

1. A control for a machine for pulling a crystal from a melt in a crucible, which includes means for pulling the crystal and heating the melt, and in which the crucible or its heater is vertically moved in accordance with the pull speed comprising:

A. detecting means active along an operative axis to line up with a selected crystal-melt interface position to define a predetermined crystal diameter and for detecting departure of the actual crystal-melt interface from said selected position and providing a signal in response to sensing such departure; said detecting means comprising a pyrometer having a sighting axis inclined with respect to the axis of the crystal being pulled;

B. means responsive to said signal for adjusting the melt temperature and/or the crystal pull speed to restore said interface to said selected position; and

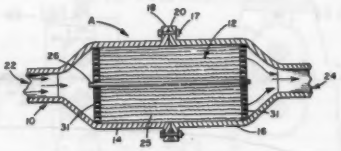


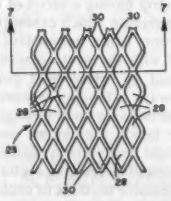
C. means responsive to the level of said melt for moving said operative axis as said melt level varies, said axis moving means comprising exclusively means for angularly displacing said sighting axis of said pyrometer; thereby to produce a crystal of substantially uniform diameter.

3,998,599
SYSTEM FOR CATALYTIC REDUCTION OF NO_x EMANATING FROM AN INTERNAL COMBUSTION ENGINE

Robert Joseph Fedor, Westlake, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Continuation of Ser. No. 507,748, Sept. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 249,884, May 3, 1972, abandoned. This application Jan. 23, 1976, Ser. No. 651,628
Int. Cl.² B01J 8/00; F01N 3/15
U.S. Cl. 23—288 FC 10 Claims





1. In an article for catalytically reducing oxides of nitrogen found in exhaust gases emanating from an internal combustion engine comprising:

a housing adapted to be mounted in the exhasut system of an internal combustion engine; and

a catalytic structure means effective to reduce NO_x placed

in said housing and sized such that a major portion of the gases passing through said housing must pass through said catalytic structure means, the improvement comprising said catalytic structure means including a plurality of sheets of expanded thin metal foil having an NO_X reducing catalyst on the surface thereof wherein at least one sheet of said expanded metal foil has at least some openings therein which are of a different size than at least some openings in another sheet of expanded metal foil in face-to-face juxtaposition therewith.

6. In an article for catalytically reducing oxides of nitrogen found in exhaust gases emanating from an internal combustion engine comprising:

a housing adapted to be mounted in the exhaust system of an internal combustion engine; and

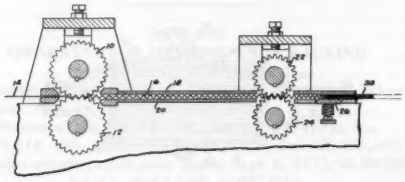
a catalytic structure means effective to reduce NO_X placed in said housing and sized such that a major portion of the gases passing through said housing must pass through said catalytic structure means, the improvement comprising said catalytic structure means comprising a plural layer structure including an expanded thin metal foill sheet having an NO_X reducing catalyst on the surface thereof with said sheet having opening therein at least some of which are of different size the layers of said plural layer structure being in face-to-face juxtaposition with each other.

3,998,600

HEAT EXCHANGER STRIP AND METHOD AND APPARATUS FOR FORMING SAME

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed June 16, 1975, Ser. No. 587,084
Int. Cl.² F28D *1/02;* **B21D** *13/10*
U.S. Cl. 29—180 SS **24 Claims**



1. A strip of metal fin stock for use in heat exchangers comprising a metal strip having a series of longitudinally successive convolutions therein which extend transversely of the strip, each convolution being connected at the upper and lower edges thereof with the next adjacent convolutions on opposite sides thereof by return bent portions to define a plurality of passageways extending transversely of the strip, the two convolutions defining each passageway having a plurality of successive bends therein as viewed in horizontal section such that said transversely extending passageways each comprise a series of successive sections oriented in zigzag fashion, said successive sections of each passageway being disposed symmetrically on opposite sides of a center line extending transversely of the strip at the return bent portions connecting them to convolutions defining each passageway, the crests of the alternate bends in one convolution of each passageway being aligned transversely along said center line with the roots of the other convolution of the passageway, whereby said center lines comprise straight bend lines about which each of the convolutions is bendable.

3,998,601

THIN FOIL

Charles B. Yates, and Adam M. Wolski, both of Edgewater Park, N.J., assignors to Yates Industries, Inc., Bordentown, N.J.

Filed Dec. 3, 1973, Ser. No. 421,236
Int. Cl.² C25D *1/04, 1/22;* **B23P** *3/00*
U.S. Cl. 29—195 **36 Claims**

1. A composite foil comprising an electrodeposited copper support layer, a second electrodeposited copper layer of a thickness which is not self-supporting and a thin layer of a release agent intermediate said copper support layer and said second copper layer, said composite foil being capable of being taken up into rolled form.

3,998,602

METAL PLATING OF POLYMERIC SUBSTRATES

Carl Horowitz; Michael Dichter, and Duryodhan Mangaraj, all of Polymer Research Corp. of America, 2186 Mill Ave., Brooklyn, N.Y. 11234

Filed Feb. 7, 1975, Ser. No. 548,091
Int. Cl.² C23C *3/02*
U.S. Cl. 29—195 **21 Claims**

1. The method of electrolessly plating a polymeric substrate comprising the steps of

A. acid etching said polymeric substrate;

B. grafting one or more polymerizable monomers from a monomeric solution to the surface of said etched polymeric substrate

1. and polymerizing said monomers to form a polymerized layer on said substrate,

2. by initiating said grafting in the presence of a small but effective amount of a soluble silver salt and to intersperse metallic silver in the polymerized layer as it is formed;

C. curing said polymerized layer; and then

D. contacting said grafted polymerized layer with an electroless metal plating bath whereby the metal from said electroless plating bath is deposited on silver atoms physically bound by the interstices of said polymerized layer.

3,998,603

PROTECTIVE COATINGS FOR SUPERALLOYS

John R. Rairden, III, Niskayuna, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 392,547, Aug. 29, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,431
Int. Cl.² C23C *13/02;* **B32B** *15/20*
U.S. Cl. 29—197 **12 Claims**

1. A method of improving the high temperature oxidation and corrosion resistance of a nickel-base or cobalt-base superalloy body which comprises the steps of:

a. coating the superalloy body by physical vapor deposition with a first coating of a composition consisting essentially in weight percent of 50–80% nickel and 20–50% chromium of uniform thickness within ± 0.1 mil,

b. then by physical vapor deposition providing on the resulting nickel-chromium a coating of aluminum of thickness in the ratio range to the nickel-chromium coating from one to ten to three to one and of uniform thickness within ± 0.1 mil, the aggregate thickness of the nickel-chromium coating and the aluminum coating being from one to seven mils; and

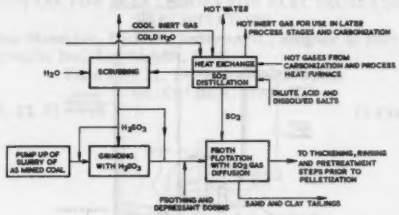
c. then subjecting the resulting duplex coated superalloy body to heat treatment and thereby strengthening it while bonding the nickel-chromium coating to the body and diffusing aluminum into the nickel-chromium coating and forming a chromium diffusion barrier.

3,998,604

DEMINERALIZATION OF BROWN COAL

David William Hinkley, Brighton Beach, Australia, assignor to International Oils Exploration N.L., Melbourne, Australia

Filed Sept. 23, 1974, Ser. No. 508,262
Int. Cl.² B03B 1/04
U.S. Cl. 44—1 R 11 Claims


HOT WATER
COOL INERT GAS
COLD H_2O
HOT INERT GAS FOR USE IN LATER PROCESS STAGES AND CARBONIZATION
H_2O
SCRUBBING
HEAT EXCHANGE
SO_2 DISTILLATION
HOT GASES FROM CARBONIZATION AND PROCESS HEAT FURNACE
DILUTE ACID AND DISSOLVED SALTS
SO_2
H_2SO_3
PUMP UP OF SLURRY OF AS MINED COAL
GRINDING WITH H_2SO_3
FROTH FLOTATION WITH SO_2 GAS DIFFUSION
TO THICKENING, RINSING AND PRETREATMENT STEPS PRIOR TO PELLETIZATION
FROTHING AND DEPRESSANT DOSING
SAND AND CLAY TAILINGS

1. A brown coal demineralization process which includes the steps of forming the as mined brown coal into a slurry, grinding said slurry in the presence of aqueous sulphurous acid, subjecting said ground slurry to a froth flotation treatment in the presence of flotation reagents in which SO_2 is dissolved in the slurry to maintain acid concentration and withdrawing said brown coal for further downstream treatment.

3,998,605

POLYMER SOLUTION

Desmond Wilfrid John Osmond, Windsor; Norman Douglas Patrick Smith, and Frederick Andrew Waite, both of Farnham Common, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 79,702, Oct. 9, 1970, abandoned.
This application July 9, 1973, Ser. No. 377,193
Claims priority, application United Kingdom, Oct. 10, 1969, 49835/69
The portion of the term of this patent subsequent to Dec. 7, 1993, has been disclaimed.
Int. Cl.² C10L 1/16
U.S. Cl. 44—62 4 Claims

1. A free-flowing liquid hydrocarbon aircraft fuel having a flash point not less than 90° F and containing dissolved therein from 0.01% to 1% by weight of a copolymer of ethylene and propylene which contains not more than 95% by weight of ethylene and has a molecular structure comprising at least 2 runs of at least 10 units of ethylene separated by runs of a hydrocarbon-soluble polymer which may be a random copolymer of ethylene and propylene or a homopolymer of propylene, the dissolved copolymer being soluble in said fuel and of molecular weight at least 10^6 (viscosity average) or of intrinsic viscosity greater than 2.5 dls./gm. and being present in a concentration such that there is molecular overlap of the dissolved copolymer, the amount of said copolymer being insufficient to increase the viscosity of said liquid to more than 1 poise.

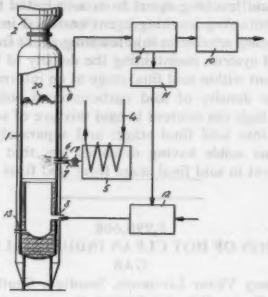
3,998,606

METHOD AND APPARATUS FOR MANUFACTURING REDUCING GAS

Tsuneo Miyashita; Shoichiro Ohzeki, both of Yokohama, and Toshio Nayuki, Kawasaki, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 19, 1974, Ser. No. 462,589
Claims priority, application Japan, Apr. 23, 1973, 48-45018
Int. Cl.² C10J 3/00, 3/16
U.S. Cl. 48—71 24 Claims

10. Apparatus for manufacturing reducing gas comprising:
a slag-tap type furnace provided with an opening at the top for charging a solid carbonaceous substance into the furnace;
a tuyere at the hearth of the furnace for blowing steam and oxygen or oxygen-rich air into said furnace;
a first discharge opening at the crucible of said furnace for discharging the ash components of said solid carbonaceous substance in the form of a molten slag;
a second discharge opening near the furnace top for discharging the gas produced;



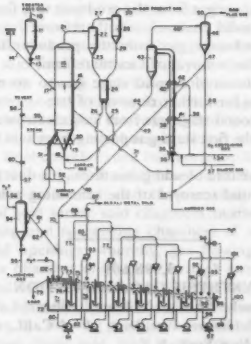
a source of a heated and liquefied high calorie substance;
a source of gas; and
a nozzle coupled to said gas source and to said high calorie substance source for atomizing said heated and liquefied high calorie substance and blowing said atomized high calorie substance into a region of said furnace in which said solid carbonaceous substance is maintained at a temperature of from 600° to 1200° C.

3,998,607

ALKALI METAL CATALYST RECOVERY PROCESS

Robert D. Wesselhoft, Baytown, and Charles J. Vadovic, La Porte, both of Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed May 12, 1975, Ser. No. 576,817
Int. Cl.² C10J 3/06, 3/54
U.S. Cl. 48—197 R 13 Claims



1. A process for the recovery of alkali metal catalyst residues from a mixture of solid particles containing said alkali metal catalyst residues, carbonaceous solids, and particles of high ash content and for simultaneously separating said carbonaceous solids and particles of high ash content which com-

prises introducing said mixture of solid particles into the final stage of a countercurrent multistage leaching system having an initial stage and a final stage; introducing an aqueous leaching agent into said initial stage of said leaching system; passing particles of high ash content having densities greater than that of said leaching agent in said final stage and said leaching agent countercurrently through said leaching system; withdrawing particles of high ash content which have densities greater than that of said leaching agent in said final stage and are substantially depleted of alkali metal catalyst residues soluble in said leaching agent from said initial stage of said system; withdrawing leaching agent enriched in alkali metal catalyst residues soluble in said leaching agent from said final stage of said system; maintaining the density of the enriched leaching agent within said final stage at an intermediate value between the density of said carbonaceous solids and said particles of high ash content in said mixture of solid particles introduced into said final stage; and separately recovering carbonaceous solids having densities less that that of said leaching agent in said final stage from said final stage.

3,998,608

PRODUCTION OF HOT CLEAN INDUSTRIALLY USABLE GAS

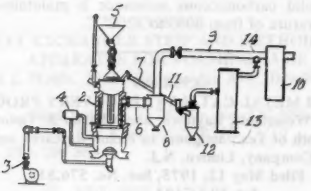
Gerald Sydney Victor Livemore, Sandton, South Africa, assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Aug. 12, 1975, Ser. No. 603,987

Claims priority, application South Africa, Aug. 15, 1974, 74/5251

Int. Cl.² C10K *1/02*

U.S. Cl. 48—197 R **3 Claims**



1. In a method for producing hot clean industrially usable gas from solid carbonaceous material, such as coal, introduced to a two-stage producer, the steps comprising:

passing first-stage gas from the producer to a first separator to remove solid contaminants therefrom;

passing second-stage gas from the producer to a second separator for removal of tars therefrom;

passing the detarred second stage gas to an electrostatic precipitator for further removal of tar;

mixing the second stage gas from said electrostatic precipitator with the first stage gas passing from said first separator; and

passing the mixture of said gases through a dust precipitator for substantial removal of the remaining solid contaminants therefrom.

3,998,609

SYNTHESIS GAS GENERATION

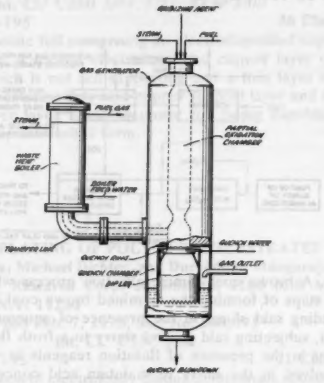
William B. Crouch, Whittier; William L. Slater, La Habra, and Warren G. Schlinger, Pasadena, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,535

Int. Cl.² C10J *3/16*; C10K *1/00*

U.S. Cl. 48—197 R **9 Claims**

1. A process for the production of synthesis gas of reduced particulate content in the absence of liquid scrubbing which comprises subjecting a carbonaceous fuel to partial oxidation to produce a synthesis gas stream containing entrained solid particles comprising soot and ash, passing said gas stream through a confined zone thereby accelerating the rate of flow of said gas stream to a velocity of at least five feet per second



whereby the velocity of said solid particles is also increased and withdrawing as a sidestream at least a portion of said accelerated gas stream, said portion having a reduced solids content while the accelerated particles continue on their path.

3,998,610

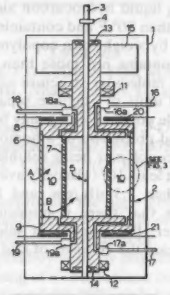
ROTATING CONCENTRIC HOMOGENEOUS TURBULENCE CENTRIFUGE

William Cumming Leith, Trail, Canada, assignor to Cominco Ltd., Vancouver, Canada

Continuation-in-part of Ser. No. 198,911, Nov. 15, 1971, abandoned. This application Dec. 12, 1974, Ser. No. 532,080

Int. Cl.² B01C *45/12*

U.S. Cl. 55—17 **14 Claims**



1. A method for separating and enriching mixtures of gases based on differences between the molecular weights of gases in said mixture in a gas centrifuge having an inner, perforate, rotatable cylinder and an outer, continuous, smooth-walled, rotatable cylinder concentric with said inner cylinder defining an annulus therebetween, the radius of the inner cylinder being in the range of from about 0.70 to about 0.95 of the radius of the outer cylinder; said method comprising the steps of feeding a mixture of gases into said annulus in the centrifuge; rotating said inner and outer rotatable concentric cylinders at peripheral velocities to separate the mixture of gases into a lighter fraction and a heavier fraction; establishing a

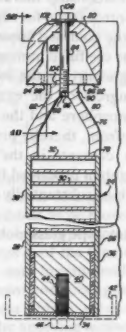
multiple array of cellularly-shaped stationary vortices in the gases in the annulus, whereby the residence time of the gases in the annulus is increased; removing the lighter fraction from the inner area of the annulus; and, removing the heavier fraction from the peripheral area of the annulus.

3,998,611

COLLECTOR ELECTRODES FOR ELECTROSTATIC PRECIPITATORS

Horst Honacker, Paradise Valley, Ariz., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed May 22, 1975, Ser. No. 579,960
Int. Cl.² B03C *3/78*
U.S. Cl. 55—118 **19 Claims**



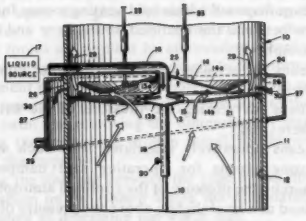
1. A collector electrode for electrostatic precipitators; a hollow cylindrical body having upper and lower open ends; said body having substantially annular upper and lower edge portions; said collector electrode having a substantially vertical axis concentric with said annular edge portions; said body having an inner concave annular wall and an outer convex annular wall; said inner and outer walls being spaced apart; lightweight filler means between said walls; said filler means structurally connecting said walls together; said inner and outer walls and said upper and lower edge portions bonded together and encapsulating said lightweight filler means.

3,998,612

ANNULAR VENTURI GAS SCRUBBER

Alvin S. Lundy, West Bloomfield, Mich., assignor to Schneible Company, Holly, Mich.

Filed Sept. 5, 1975, Ser. No. 610,696
Int. Cl.² B01D *47/10*
U.S. Cl. 55—220 **17 Claims**



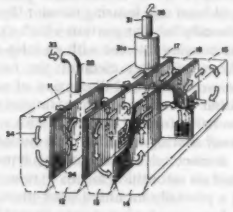
1. A venturi gas scrubber comprising a casing having a vertical wall defining a gas treatment chamber, a nozzle disposed along the vertical mid line of said chamber having an annular discharge orifice oriented for directing liquid under pressure radially outwardly about substantially 360° in a generally horizontal plane, and an annular venturi extending about said orifice, said venturi being defined by upper and lower walls spaced apart to form a narrow annular slot extending along said plane, said walls diverging from each other in a radially inward direction from said slot and also diverging in a radially outward direction from said slot, said lower wall being provided with an enlarged central aperture for the entry of upwardly flowing gas into the space between said walls, said casing having inlet means below said lower wall for the flow of contaminated gas into said casing and towards said central aperture and having outlet means for the outflow of gas discharged from said venturi, drain means for contaminated liquid, and means for delivering liquid under pressure to said nozzle.

3,998,613

APPARATUS FOR REMOVING SULFUR DIOXIDE AND PARTICULATE MATTER FROM FLUE GASES

Donald B. Attig, P.O. Box 50, Pontiac, Ill. 61764

Filed Oct. 29, 1974, Ser. No. 518,706
Int. Cl.² B01D *47/02*
U.S. Cl. 55—256 **11 Claims**



1. An apparatus for extracting sulfur dioxide and particulate matter from hot flue gases, comprising a first chamber, final chamber, and plurality of intermediate chambers arranged in horizontal series; each of said chambers having top, bottom, and side walls; said first chamber being provided with gas inlet means and said final chamber being provided with gas outlet means; passage means providing flow communication between said chambers of said series; said passage means including an opening through a lower portion of a side wall of said first chamber, an opening through a lower portion of a side wall of said final chamber, and two horizontally-spaced openings through lower portions of those side walls of each of said intermediate chambers adjacent the preceding and succeeding chambers of said series; said chambers communicating with the preceding and succeeding chambers of said series only through said openings; whereby, gas flowing through each intermediate chamber must enter through one of said spaced openings and exit at a horizontal distance therefrom through the other of said openings; pumping means connected to said outlet means for drawing flue gases under pressure through said chambers from said inlet means through said outlet means; each of said chambers containing a substantial volume of water and said pumping means being capable of drawing flue gases through said chambers under sufficient pressure to displace an amount of water from one chamber to the next in said series and to maintain said final chamber substantially filled with water.

3,998,614
INTERNAL COMBUSTION ENGINE AIR INDUCTION ASSEMBLY

Helmut Schonberger, Ginsheim; Manfred Wolfsberger, and Walter Funke, both of Russelsheim, all of Germany, assignors to General Motors Corporation, Detroit, Mich.

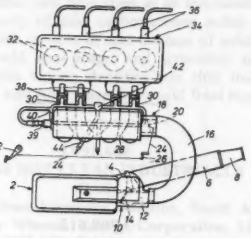
Filed Aug. 30, 1974, Ser. No. 502,151

Claims priority, application Germany, Sept. 12, 1973, 2345930

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B01D 27/08

U.S. Cl. 55—417 **1 Claim**



1. An air induction assembly for an engine comprising: an air filter housing defining an interior with an inlet and an outlet therein for the passage of air through said housing interior; an air filter element supported in said housing interior between said inlet and said outlet so that air flowing therebetween is filtered; means in said housing for smoothing the flow of air discharged from said housing interior through said outlet including a generally tubular portion which extends from said outlet into said housing interior with an inlet and terminating downstream from said filter element; the ratio between the length and the cross-sectional dimension of said tubular portion falling within the range of approximately 3–4 to 1; said tubular portion being formed integrally with said housing with a portion thereof sharing a wall of said housing; an air volumeter fluidly connected to said outlet immediately downstream from said air smoothing means to receive air therefrom and including a pivotally mounted back-pressure valve member; restoring force producing means operably connected to said valve and normally maintaining it in a closed position during periods when the engine is inactive whereby said valve is moved to a more open position against said restoring force producing means by the flow of air through said outlet, the angular extent of said rotation corresponding to the volume of air flowing therepast; a branch pipe fluidly connected to said flow straightening tubular portion through said shared wall and near said inlet end to permit the passage of fluid therethrough into said tubular portion a sufficient distance upstream from said air volumeter to prevent interference therewith whereby said branch pipe is adapted to be connected to a container of activated carbon for withdrawing fluid from said container.

3,998,615
GLASS MELTING FURNACE AND METHOD OF OPERATION

Clarence A. Gartz, Jr., Perrysburg, and Millen E. Luhrs, Toledo, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Mar. 31, 1975, Ser. No. 563,620

Int. Cl.² C03B 5/16

U.S. Cl. 65—29 **5 Claims**

1. In a method of operating a glass melting furnace for producing a continuous ribbon of glass substantially free of optical defects, the furnace being of the type including an enclosed tank containing a mass of molten glass flowing from its melting end towards its working end and wherein the headspace above the molten glass in the working end is separated from the heaspace above the molten glass in the melting end to provide a confined atmosphere over the molten glass in said working end within which the pressure tends to increase as the molten glass is refined, the improvement comprising the steps of:

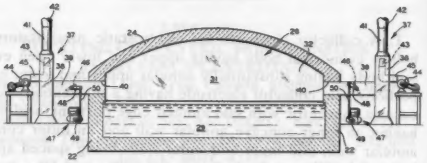
a. venting the confined atmosphere of the headspace over the molten glass in the working end of the furnace to the surrounding external atmosphere;

b. dampering the venting of said confined atmosphere for controlling the pressure in the confined atmosphere;

c. sensing the pressure of said confined atmosphere and of the external atmosphere and producing a control signal in response to the relationship therebetween; and

d. employing the control signal for regulating the dampering of the venting of the confined atmosphere for maintaining the pressure of the confined atmosphere at a level slightly higher than the pressure of the external atmosphere for preventing the ingress of the external atmosphere into said confined atmosphere and the egress of the confined atmosphere therefrom, thereby preventing the formation of disturbing air currents in the confined atmosphere whereby a glass ribbon produced from the molten glass in the working end is of substantially improved optical quality.

3. In an enclosed tank-type glass melting furnace of the type



having a melting end and a working end and containing a mass of molten glass flowing from the melting end toward the working end wherein the headspace above the molten glass in the working end is partitioned from the headspace above the molten glass in the melting end to form a confined atmosphere over the molten glass in the working end wherein the pressure of the confined atmosphere tends to build up during refining of the molten glass in the working end, the improvement comprising:

a. means for venting the confined atmosphere to the external atmosphere;

b. means disposed within said venting means for dampering flow between the confined atmosphere and the external atmosphere;

c. means for sensing the pressure of the confined atmosphere;

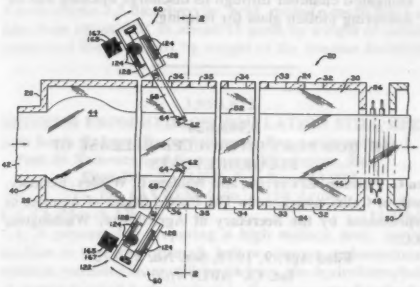
d. means for sensing the pressure of the external atmosphere; and

e. means operatively associated with each said pressure sensing means for operating said dampering means whereby the pressure of the confined atmosphere is maintained at a level slightly above the pressure of the external atmosphere for preventing ingress of external atmosphere into said confined atmosphere, thereby preventing the formation of disturbing air currents in said confined atmosphere whereby molten glass taken from the working end of the melting furnace is of substantially improved optical quality.

3,998,616
MANUFACTURE OF FLAT GLASS HAVING CONTROLLED WIDTH AND NIP WIDTH

Aloysius W. Farabaugh, Verona, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 3, 1975, Ser. No. 546,846
Int. Cl.² C03B *18/02*
U.S. Cl. 65—29 27 Claims



1. A device used in combination with an attenuating apparatus for maintaining nip width of a glass ribbon in a predetermined range, the glass ribbon to be moved along a glass ribbon movement path on a pool of supporting molten metal wherein the attenuating apparatus is of the type comprising means for applying translational and longitudinal forces to the glass ribbon, the applying means comprising means for engaging the upper surface of the glass ribbon; means mounting the applying means for moving the applying means along a first reciprocating path generally transverse to the glass ribbon movement path, comprising:

means for sensing the incremental displacement of the edge of the glass ribbon along a second reciprocating path generally parallel to the first reciprocating path;

means for mounting said sensing means in spaced relation to the engaging means and over the surface of the supporting molten metal and the upper surface of the glass ribbon; and

means responsive to said sensing means and acting on the moving means for moving the applying means in a first direction to increase the nip width when the nip width as indicated by said sensing means is at least equal to or below the minimum nip width of the predetermined range and for moving the applying means in a second direction opposite to the first direction to decrease the nip width when the nip width as indicated by said sensing means is at least equal to or greater than the maximum nip width of the predetermined range.

16. In a method of manufacturing flat glass comprising the steps of providing molten glass on a pool of supporting molten metal, flowing the molten glass downstream along a ribbon movement path on the pool of molten metal, applying attenuating forces upon the glass ribbon while cooling the glass ribbon to form a dimensionally stable ribbon wherein the attenuating forces are applied by attenuating means adjacent the edges of the glass ribbon at an angle to the normal of the glass movement path and the attenuating means are moveable along a reciprocating path generally transverse to the ribbon movement path; and removing the dimensionally stable glass ribbon from the supporting molten metal, the improvement comprising the steps of:

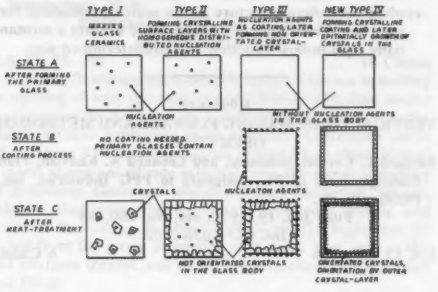
measuring the distance between the edge of the ribbon and the position on the ribbon where the attenuating forces are applied to determine nip width; and

moving the attenuating means in response to the measured distance (1) in a first direction along the reciprocating path to decrease the nip width when the nip width is greater than a predetermined amount and (2) in a second direction along the reciprocating path opposite to the first direction to increase the nip width when the nip width is less than a predetermined amount.

3,998,617
METHOD OF IMPROVING THE MECHANICAL STRENGTH OF GLASS

Georg Gliemeroth, Mainz-Mombach, Germany, assignor to Jenaer Glaswerk Schott & Gen., Germany

Continuation-in-part of Ser. No. 863,684, Oct. 3, 1969, abandoned. This application Jan. 17, 1972, Ser. No. 218,130
Claims priority, application Germany, Oct. 24, 1968, 1804839
Int. Cl.² C03B *32/00*; C03C *17/22*, *3/22*
U.S. Cl. 65—33 4 Claims

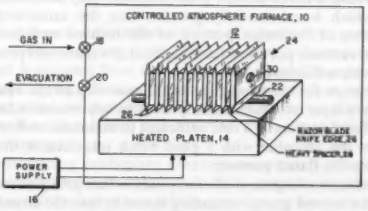

TYPE I
MEIER'S GLASS CERAMICS
TYPE II
FORMING CRYSTALLINE SURFACE LAYERS WITH HOMOGENEOUS DISTRIBUTED NUCLEATION AGENTS
TYPE III
NUCLEATION AGENTS AS COATING, LATER FORMING HIGH ORIENTATED CRYSTAL-LAYER
NEW TYPE IV
FORMING CRYSTALLINE COATING AND LATER EPITAXIALLY GROWING OF CRYSTALS IN THE GLASS
STATE A
AFTER FORMING THE PRIMARY GLASS
NUCLEATION AGENTS
WITHOUT NUCLEATION AGENTS IN THE GLASS BODY
STATE B
AFTER COATING PROCESS
NO COATING NEEDED, PRIMARY GLASSES CONTAIN NUCLEATION AGENTS
CRYSTALS
NUCLEATION AGENTS
STATE C
AFTER HEAT-TREATMENT
NOT ORIENTATED CRYSTALS IN THE GLASS BODY
ORIENTATED CRYSTALS, ORIENTATION BY OUTER CRYSTAL-LAYER

1. A method of improving the mechanical strength of a preformed article of manufacture comprised of crystallizable lithiaalumino-silicate glass devoid of nucleating agents comprising the steps of (A) applying to said article in an uncrystallized state a coating composition comprising a stoichiometric mixture of compounds which through heating is convertible into an epitaxially effective crystalline lithia-alumino-silicate layer, (B) heating said so-coated article to temperatures sufficiently high to accomplish said conversion but lower than the melting temperatures of crystalline lithia-alumino-silicate, and (C) further heating said so heat treated article at elevated temperatures amd for a length of time sufficient to cause the formation in the surface of said article adjacent said layer crystal phases of lithia-alumino-silicate which have a lower coefficient of thermal expansion than the uncrystallized lithia-alumino-silicate comprising said article.

3,998,618
METHOD FOR MAKING SMALL GAS-FILLED BEADS

John R. Kreick, and Glenn A. Anderson, both of Nashua, N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Nov. 17, 1975, Ser. No. 632,419
Int. Cl.² C03B *23/10*
U.S. Cl. 65—105 11 Claims



1. A method of forming gas-filled enclosures comprising the steps of

providing a sealed hollow structure containing a gas and having heat deformable walls which are deformable above a predetermined softening temperature, said structure being maintained at a temperature below the soften-

ing temperature of said walls, whereby said structure is substantially rigid;

heating the hollow structure provided in a sealed furnace in an unrestrained substantially free condition above the softening temperature of said walls to a range at which said walls become stretchable while still maintaining the original integrity of the hollow structure;

initially controlling the pressure of the gas within said sealed furnace such that said hollow structure is permitted to expand;

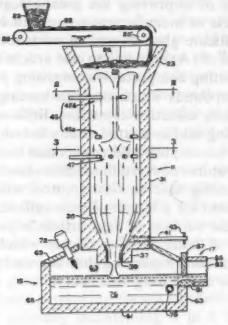
increasing the pressure of the gas surrounding said hollow structure when a desired size is obtained to a pressure which balances the forces of expansion; and

cooling the hollow structure in the sealed pressurized furnace below said softening temperature to form a substantially rigid hollow structure of a predetermined size.

3,998,619
VERTICAL GLASSMAKING FURNACE AND METHOD OF OPERATION

Richard L. Cerutti, Seminole, and Leonard A. Knavish, Plum Borough, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 19, 1976, Ser. No. 650,389
Int. Cl.² C03B 5/02
U.S. Cl. 65—136 **6 Claims**



1. A furnace for melting and refining glass comprising

a. a vertically elongated chamber for holding molten glass having an uppermost portion having its walls flared outwardly from the walls of its major portion at a sufficient angle and for a sufficient length to provide an upper batch receiving portion which provides a cross-sectional area at which a batch-molten glass interface may be maintained which is substantially greater than the cross-sectional area of the major portion of the furnace and having a lowermost portion that is tapered inwardly and provided with a discharge opening;

b. means for charging glass batch materials to the chamber as a layer over substantially all of its uppermost outwardly flared portion at a rate sufficient to maintain molten glass in the chamber with a glass batch interface in the outwardly flared portion;

c. at least two groups of electrodes, a first group and above it a second group, extending inwardly into the chamber at two different elevations, both above the midsection of the chamber, wherein the first group of electrodes comprises at least eight electrodes at a common elevation about the periphery of the chamber and extending only slightly inwardly from its walls, wherein the second group of electrodes comprises at least three electrodes at at least one elevation closely spaced above the elevation of the first group of electrodes with the at least three electrodes extending inwardly into the chamber farther than those of the first group, and wherein the electrodes are connected to a source of electric power for energizing the electrodes to heat molten glass in the chamber and for controlling flows therein; and

d. means for receiving molten glass from the vertically elongated chamber through its discharge opening and for delivering molten glass for forming.

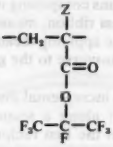
3,998,620
METHOD FOR CONTROLLED RELEASE OF FLUOROKETONES

Allen G. Pittman, El Cerrito, and William L. Wasley, Berkeley, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 9, 1970, Ser. No. 27,175
Int. Cl.² A01N 9/00
U.S. Cl. 71—85 **6 Claims**

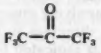
1. A method for gradually releasing a fluoro-ketone in plants or soils which comprises

a. applying to the plant or soil a polymer containing recurring units of the structure



wherein Z is a member of the group consisting of H and CH_3, and

b. maintaining the treated plant or soil in a moist condition whereby gradual cleavage of the polymer occurs with gradual release of a fluoro-ketone of the structure

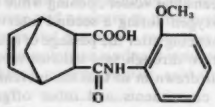


3,998,621
TRIAZINE—ANTIDOTE COMPOSITIONS AND METHODS OF USE FOR COTTON

Ferenc M. Pallos, Walnut Creek, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 566,654, April 10, 1975, abandoned, which is a continuation-in-part of Ser. No. 450,923, March 13, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,875
Int. Cl.² A01N 9/22
U.S. Cl. 71—93 **12 Claims**

1. An herbicide composition comprising a mixture of an effective amount of a triazine herbicide selected from the group consisting of 2-chloro-4-ethylamino-6-isopropylamino-s-triazine and 2-(4-chloro-6-ethylamino-s-triazin-2-yl-amino)-2-methylpropionitrile, and an antiodote compound therefor corresponding to the formula



5-norbornene-2,3-dicarboxylic acid mono(o-methyoxy)-anilide; from about 0.01 to about 15 parts by weight of antidote compound for each part by weight of the triazine herbicide.

3,998,622

RHODIUM FROM HYDROFORMYLATION STILL HEELS

Jean Louis Balmat, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 23, 1975, Ser. No. 643,913
Int. Cl.² B22F 9/00; C22B 34/00
U.S. Cl. 75—.5 AB 11 Claims

1. A process for preparing a high surface area, metallic rhodium in the form of small, hollow, porous agglomerates of rhodium particles from still heels from the hydroformylation of an unsaturated hydrocarbon in the presence of a rhodium trialkyl phosphite ligand complex catalyst whereby 90% or more of the rhodium present in the still heels is converted to said rhodium form, said process comprising

a. adjusting the pH of the still heels from about 3 to about 8 with a base selected from an alkali metal hydroxide and an alkaline earth metal hydroxide;

b. heating the solution from (a) for from about 15 minutes to about 120 minutes at about 115° to about 175° C in the presence of water, the ratio of water to still heel being from about 0.1:1 to 1:1; and

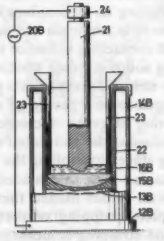
c. recovery the rhodium in the form of hollow spheres of agglomerated particles.

3,998,623

METHOD OF PRODUCING ALLOYS CONTAINING TITANIUM CARBIDE

Vaino Lampe, and Bengt Sjoberg, both of Hagfors, Sweden, assignors to Uddeholms Aktiebolag, Hagfors, Sweden

Filed July 8, 1975, Ser. No. 594,009
Claims priority, application United Kingdom, July 17, 1974, 31754/74; Sweden, Apr. 9, 1975, 7504056
Int. Cl.² C22B 4/06
U.S. Cl. 75—10 R 5 Claims



1. Method of producing an iron, cobalt or nickel alloy containing at least 0.6 wt. % of titanium carbide wherein titanium and carbon are brought together in a melt of a matrix alloy and the melt is caused to solidify so shortly after the bringing together of the carbon and titanium therein that the average grain size of the resulting titanium carbide in the alloy does not exceed 10 microns and not more than 4 percent of the titanium carbide grains are of a grain size more than 20 microns in the alloy in which method a titanium-containing melt is formed by continuous electrothermic melting of a substantially carbon-free electrode containing titanium, in a mold having a slag bath covering the surface of the melt; simultaneously adding carbon to said melt; and continuously producing an ingot from the resulting carbon-containing melt by congealing the melt in a brief period not exceeding ten minutes.

3,998,624

SLAG FLUIDIZING AGENT AND METHOD OF USING SAME FOR IRON AND STEEL-MAKING PROCESSES

Morton E. Harris, Bloomfield Hills, and Terrance E. Kelley, Southfield, both of Mich., assignors to Mercier Corporation, Birmingham, Mich.

Filed Oct. 6, 1975, Ser. No. 619,977
Int. Cl.² C21B 5/04
U.S. Cl. 75—30 19 Claims

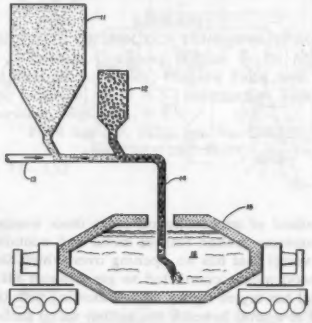
1. A slag fluidizing and conditioning agent for use in melting or refining of iron and steel in combination with lime and/or limestone as the basic fluxing agent which comprises a particulated mixture containing as its essential constituents about 5% to about 95% calcium fluoride, about 5% to about 95% of a metal aluminum silicate selected from the group consisting of potassium aluminum silicate, sodium aluminum silicate, calcium aluminum silicate, barium aluminum silicate and mixtures thereof, up to about 75% of an iron ingredient selected from the group consisting of metallic iron, iron oxide, and mixtures thereof; and up to 50% miscellaneous impurities and fillers.

3,998,625

DESULFURIZATION METHOD

Peter J. Koros, Pittsburgh, Pa., assignor to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,347
Int. Cl.² C21C 7/02
U.S. Cl. 75—53 12 Claims



1. A method for desulfurizing molten ferrous metal, comprising:

a. Forming a fluidized first mixture of a particulate material that is non-oxidizing with respect to molten ferrous metal and is selected from the group consisting of lime, metallurgical slag, alumina, fly ash, silica, and calcium carbide and sized so that about 80 percent of its particles are smaller than about 100 microns with a non-oxidizing carrier gas;

b. Introducing particulate magnesium-containing material sized so that substantially all of its particles are below about 300 microns into said first mixture to form a second mixture; and then

c. Transporting and injecting the second mixture beneath the surface of sulfur-containing molten ferrous metal so as to remove sulfur from said ferrous metal, said non-oxidizing particulate material and said magnesium-containing material injected at a rate of from about 90 to 300

lbs./min. and from about 4 to 30 lbs. of contained magnesium/min., respectively, and further controlling injection of said magnesium-containing mixture by reducing the rate of injection of the magnesium-containing material in response to sulfur content of said molten ferrous metal in accordance with the following relationship:

$$F_s = A - B\frac{(1)}{(R)} + C\frac{(I_s)}{(T)},$$

where,

F_s = Sulfur content at end of process,
A = constant,
B = constant,
R = Lbs. Mg/min.,
C = constant,
I_s = Sulfur content at time calculation made during process,
T = Lbs. Mg/ton of molten ferrous metal.

3,998,626

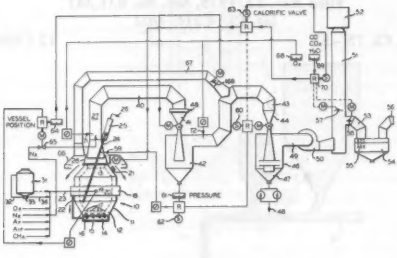
METHOD FOR AIR POLLUTION CONTROL COMBINED WITH SAFE RECOVERY AND CONTROL OF GASES FROM A BOTTOM-BLOWN STEEL CONVERTER VESSEL

Kurt Baum; Joerg Peter Baum, both of Essen-Sud, Germany; Jai Kumar Pearce, and David Lee Schroeder, both of Pittsburgh, Pa., assignors to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Division of Ser. No. 340,302, March 12, 1973, Pat. No. 3,908,969, which is a continuation of Ser. No. 209,953, Dec. 20, 1971, abandoned. This application Mar. 11, 1975, Ser. No. 557,360

Int. Cl.² C21C *5/38*

U.S. Cl. 75—60 **32 Claims**



1. A method of processing off-gases from a quantity of carbon-containing molten ferrous metal and contained in a converter vessel that has an opening over which there is a movable hood means connected to gas exhaust means and which vessel has tuyere means communicating with the interior thereof at a level beneath the molten metal surface, said method including:

delivering oxygen through said tuyere means during a first period of said process cycle to permeate said molten metal for oxidizing carbon therein wherein off-gas having a relatively small quantity of combustible constituents are produced initially,

during a first interval of said first period maintaining a separation between said hood and said vessel sufficient to permit the inflow of sufficient air through the gap between said hood and vessel opening to oxidize said combustible constituents,

maintaining the separation of said hood means from said vessel as combustible constituent production increases until substantially stoichiometric conditions of combustion exist between said combustible constituents and oxygen from said drawn in air thereby to produce a substantially inert gaseous mixture in said hood and exhaust means for purging said exhaust means substantially of combustible constituents, and then

immediately commencing a reduction in the gap between said hood means and vessel opening while continuing the delivery of oxygen during a second interval of said first period commencing after the passage of said purging inert gaseous mixture through said exhaust means to thereby reduce the air drawn in so that the increased quantity of combustible constituents and other offgases produced during an ensuing continuous oxygen delivery period do not undergo substantial combustion.

3,998,627

PROCESS FOR RECOVERING METALS FROM METAL AMMINE BEARING AMMONIUM SALT SOLUTIONS USING ION EXCHANGE RESIN

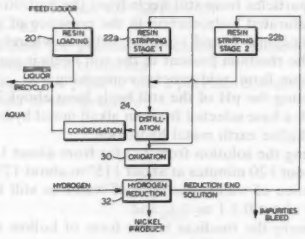
Donald Robert Weir, Fort Saskatchewan, and Verner Blakely Sefton, Edmonton, both of Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada

Filed June 6, 1974, Ser. No. 476,959

Claims priority, application Canada, Apr. 11, 1974, 197458

Int. Cl.² C22B *3/00, 15/10, 23/04, 17/04*

U.S. Cl. 75—101 BE **19 Claims**



1. The process for recovering metals selected from the group consisting of nickel, cobalt, copper, cadmium and zinc from an aqueous ammonium salt feed solution containig values of at least one said metal as dissolved complex metal ammine ions having an ammonia co-ordination of at least two and where the metal is cobalt, said metal being in the twovalent state, which comprises: contacting said metal-containing aqueous solution with a cationic ioh exchange resin in the ammonium form in one or more resin loading operations to effect loading of said resin with complex metal ammine ions from said solution, separating the resulting complex metal ammine iondepleted solution from the resulting loaded resin, contacting said loaded resin with an aqueous ammonium salt stripping solution having an ammonium ion concentration of at least two molar to strip ammonia and metal values from said resin, effecting said contacting in two or more stripping stages with fresh stripping solution being contacted in the last such stage with partially stripped resin from a preceding such stripping stage, treating at least a porton of eluate from said last such resin contacting stage to decrease the free ammonia content thereof and using the so-treated eluate as eluant for a preceding stripping stage, controlling the volume of said stripping solution contacted with said loaded resin in relation to the quantity of metal values loaded thereon such that, with substantially complete stripping of metal values from said loaded resin by said stripping solution, the concentration of said metal values in said stripping solution will be within a predetermined range, controlling and corelating the free ammonia and ammonium salt concentrations in said stripping solution such that said controlled volume of stripping solution is effective to substantially completely strip the free ammonia and metal values from the resin, and recovering the resulting metal bearing stripping solution.

7. The process according to claim 1 wherein said metal values are selected from the group consisting of nickel, cobalt, copper and cadmium, said stripping solution is an ammonium sulphate solution, the solution resulting from the stripping

operation and containing dissolved values of said selected metal is reacted with a non-sulphidizing reducing gas at elevated temperature and pressure to reduce said selected metal to elemental form and produce a reduction end solution containing ammonium sulphate, and said reduction end solution is utilized to make up, at least in part, said stripping solution.

3,998,628

METHOD FOR SELECTIVELY DISSOLVING NON-FERROUS METALS CONTAINED IN PYRITIC ORES

Louis Gandon, Rambouillet; Jean-Michel Demarthe, Viroflay, and Alain Alexandre Sonntag, Maurepas, all of France, assignors to Societe Miniere et Metallurgique de Penarroya, Paris, France

Filed Feb. 26, 1975, Ser. No. 553,323

Claims priority, application France, Feb. 28, 1974, 74.06765

Int. Cl.² C22B *15/08, 19/22, 13/04, 11/06*

U.S. Cl. 75—104 **4 Claims**

1. A method for selectively dissolving non-ferrous metals selected from the group consisting of copper, zinc, lead and silver contained in pyritic ores, comprising crushing the ore, introducing the crushed ore, while being stirred and at a temperature above the ambient temperature, into a reaction vessel containing a solution of chlorides of a metal having two valency states selected from the group consisting of copper and iron, the concentration of said metal having two valency states being between 5 and 25 g/l and with the proviso that the ph of said solution is between −1 and 5 when the leachant is copper chloride and between −1 and 2 when the leachant is iron chloride, and injecting gaseous chloride into said reaction vessel at a rate such that the oxido-reduction potential of said solution of chlorides remains between 400 and 700 mv constant during the operation whereby a substantial amount of iron and sulphur found in the ore remains undissolved in the solution.

3,998,629

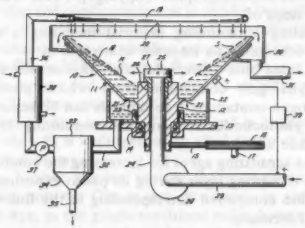
METHOD FOR RECOVERING SMALL PARTICLES OF HEAVY PRECIOUS METALS BY AMALGAMATION

Edward O. Anders, 1502 Tallulah Court, Houston, Tex. 77077

Filed Dec. 22, 1975, Ser. No. 643,528

Int. Cl.² C22B *11/10, 11/12*

U.S. Cl. 75—109 **4 Claims**



1. A method for recovering small particles of heavy precious metals such as gold or platinum from a slurry, comprising the steps of supplying mercury to a generally conical, downwardly converging, inner wall of a housing to cause a layer of the mercury to flow downwardly therealong, feeding the slurry onto the layer of mercury, rotating the housing about the vertical axis of the generally conical wall at a speed which induces the particles to settle in or amalgamate with the layer of mercury and causes the remainder of the slurry to move upwardly over the mercury layer and out of the housing, collecting the mercury and particles which flow downwardly therewith over the wall of the housing, separating the particles from the collected mercury, and returning the mercury from which the particles have been separated back to the inner wall of said housing for maintaining a continuous layer of mercury.

3,998,630

FERROUS METAL NETWORK IMPREGNATED WITH MAGNESIUM METAL

Jairaj Easwaran, Toledo, Ohio, and George S. Foerster, Hightstown, N.J., assignors to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 514,630, Oct. 15, 1974, Pat. No. 3,945,819, which is a continuation-in-part of Ser. No. 454,951, March 26, 1974, Pat. No. 3,902,892, which is a continuation-in-part of Ser. No. 385,584, Aug. 3, 1973, abandoned. This application Oct. 6, 1975, Ser. No. 619,887

Int. Cl.² C22C *33/08*

U.S. Cl. 75—130 R **3 Claims**

1. A process for treating molten iron which comprises immersing a porous ferrous metal network impregnated with magnesium into said molten iron to produce nodular iron, said metal network before being impregnated with said magnesium having a mass bulk density from 6.3 down to 4.0 g/cc, a porosity of 20% to 50%, said network impregnated with from 5% up to but not including 18% magnesium based on the weight of the impregnated network, said impregnated magnesium being released from said network in an orderly manner.

3,998,631

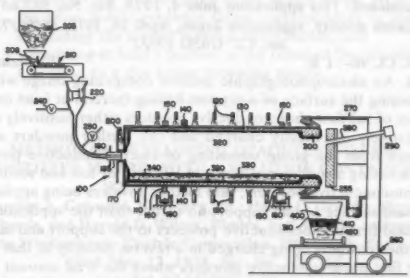
OXIDATION OF MOLTEN FERROPHOSPHOROUS

Donald J. Hansen, Lewiston; William B. De Atley, Grand Island; Robert L. Ripley, Niagara Falls, and George F. Curtis, Lewiston, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 17, 1975, Ser. No. 568,983

Int. Cl.² C22C *33/04*

U.S. Cl. 75—132 **13 Claims**



1. A process for producing oxidized ferrophosphorous which comprises providing a coating consisting essentially of oxidized ferrophosphorous on a substrate; bringing a molten mass of ferrophosphorous into and out of contact with said coating in an atmosphere of oxidizing gas by providing relaive movement between substantially all of said molten mass of ferrophosphorous and said coating on said substrate to provide repeated covering and uncovering of at least a portion of said coating by molten ferrophosphorous and the formation of oxidized ferrophosphorous.

3,998,632

METAL ALLOY

Valentin Petrovich Kosteruk, ulitsa M. Krivonosa, 19, kv. 5, and Mikhail Savvich Kovalchenko, ulitsa Kapitanovskaya, 10, kv. 20, both of Kiev, U.S.S.R.

Division of Ser. No. 248,295, April 27, 1972, Pat. No. 3,903,585, which is a continuation of Ser. No. 875,503, Nov. 10, 1969, abandoned. This application Dec. 5, 1974, Ser. No. 530,141

Int. Cl.² C22C *27/00*

U.S. Cl. 75—134 V 13 Claims

1. A brazing spelter composition, especially useful for joining high melting carbides, borides, nitrides and silicides and ceramics to each other or to high melting metals, comprising an alloy consisting essentially of hafnium as a major constituent, a first additive component selected from the group consisting of copper, gold, silver and mixtures thereof, in an amount of from 2 to 30 percent of the alloy weight, and a second additive component selected from the group consisting of boron, aluminum, scandium, yttrium, lanthanides, carbon, silicon, genanium, titanium, zirconium, vanadium, niobium (columbium), tantalum, phospohorus, chromium, molybdenum, tungsten, manganese, technetium (masurium), rhenium, ruthenium, osmium, cobalt, nickel, rhodium, iridium, platinum, and mixtures thereof in an amount of 2 to 21 percent of the alloy weight.

3,998,633

ALLOY AND METHOD FOR PRODUCING THE SAME

William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85014

Continuation-in-part of Ser. No. 477,620, June 10, 1974, abandoned. This application July 10, 1975, Ser. No. 594,624

Int. Cl.² C22C *9/01*

U.S. Cl. 75—162 4 Claims

1. An alloy comprising: copper, aluminum and Indium; the aluminum ranging between 0.5% to 7.5% by weight of the alloy and the Indium ranging between 1% and 5% by weight of the alloy; and the copper ranging in an amount to equal the remaining percentage by weight of the alloy weighing 100%.

3,998,634

POWDER ELECTROPHOTOGRAPHIC METHOD

Masakazu Iwasa, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigra, Japan

Continuation-in-part of Ser. No. 463,806, April 24, 1974, abandoned. This application June 4, 1975, Ser. No. 583,657

Claims priority, application Japan, April 24, 1973, 46400/73

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 R 20 Claims

1. An electrophotographic method comprising image-wise exposing the surface of a support having thereon at least one layer of (a) first photoconductive powders either positively or negatively electrically charged and (b) further powders selected from the group consisting of electroconductive powders having a surface resistivity of $10^{10}\Omega$sq. or less and second photoconductive powders, said further powders being applied to said surface of said support no earlier than the application of said first photoconductive powders to the support and said further powders being charged in a reverse polarity to that of the first photoconductive powders where the total amount of the positive and negative charges on said first and further powders is approximately zero to thereby form an electrostatic latent image as a result of said image-wise exposing the photoconductive powders where any of said further powders in the upper portion of said layer are phototransparent in at least a portion of the wavelength range to which said first photoconductive powders not in said upper portion are sensitive, said photoconductive and electroconductive powders being 1 – 200 microns in size, and then removing either the image-wise exposed or unexposed portion of the powders to form an image.

3,998,635

IMAGING SYSTEM

William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 837,780, June 30, 1969, Pat. No. 3,975,195, which is a continuation-in-part of Ser. Nos. 725,676, May 1, 1968, abandoned, Ser. No. 460,377, June 1, 1965, Pat. No. 3,520,681, and Ser. No. 483,675, Aug. 30, 1965, Pat. No. 3,656,990, said Ser. No. 725,676, is a continuation-in-part of Ser. No. 460,377, , Ser. No. 483,675, , and Ser. No. 403,002, Oct. 12, 1964, abandoned, said Ser. No. 460,377, and Ser. No. 483,675, each is a continuation-in-part of Ser. No. 403,002,. This application Apr. 10, 1975, Ser. No. 567,049

Int. Cl.² G03G *13/00*

U.S. Cl. 96—1 PS 35 Claims

1. An imaging method comprising the steps of:
a. providing an imaging member comprising a layer of migration material spaced apart from at least one surface of, but contacting a softenable layer;
b. applying a migration force to said migration layer; and
c. imagewise developing the softenable layer to change its resistance, in image configuration, to migration of material from the migration layer to cause an imagewise migration of migration material at least in depth in said softenable layer.

27. An imaging method comprising the steps of:
a. providing a softenable layer;
b. imagewise developing said layer to change its permeability in image configuration;
layering a migration layer on said imagewise developed softenable layer; and
d. applying a migration force to said migration layer.

3,998,636

PRODUCTION OF A PERMANENT CONDUCTIVITY PATTERN

Jozef Willy Van den Houte; Yvan Karel Gilliams, both of Berchem, and Pierre Richard De Roo, Schoten, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Feb. 21, 1975, Ser. No. 551,664

Claims priority, application United Kingdom, Feb. 22, 1974, 8237/74

Int. Cl.² G03G *5/06*, *13/22*

U.S. Cl. 96—1.4 7 Claims

1. An electrophotographic copying process which comprises the steps of:
1. providing a recording material including a recording layer containing an intimate admixture of:
i. at least one ultraviolet radiation-sensitive organic polyhalogen compound from which photolytically halogen-containing free radicals can be separated,
ii. a photoconductive polymer containing N-vinylcarbazole units, and
iii. as a sensitizing agent for increasing the conductivity of the recording layer during its photo-exposure an acylamino compound corresponding to the following general formula:

wherein:
R_1 represents a C_{1-5} alkyl or cycloalkyl group, and
R_2 represents a phenyl or naphthyl group,
2. image-wise exposing the recording material to activating electromagnetic radiation increasing the conductivity of the exposed portions of the recording layer,
3. subjecting the exposed recording layer to uniform elec-

trostatic charging, while the rear-side of the recording layer stands in contact with a conductive backing that allows the charges penetrating into the photoexposed areas to leak off,

4. developing the electrostatic charge pattern that corresponds with the non-photoexposed areas of the recording layer with an electrostatically attractable material, and

5. transferring the image-wise deposited electrostatically attractable material to a receiving material and optionally repeating the charging, developing and transfer steps at least once.

3,998,637

PROCESS FOR PRODUCING POSITIVE COLOR DIFFUSION TRANSFER IMAGES USING REDOX DYE RELEASERS

William Henry Faul, and Harry David Franchino, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

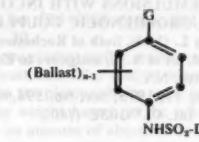
Continuation-in-part of Ser. No. 487,086, July 10, 1974, abandoned. This application Aug. 1, 1975, Ser. No. 601,067

Int. Cl.² G03C *7/00, 5/54, 7/16*

U.S. Cl. 96—3 **8 Claims**

3. A process for producing a multicolor positive photographic transfer image which comprises:

1. providing an imagewise exposed photographic element comprising a support having coated thereon a red-sensitized color-forming unit, a green-sensitized color-forming unit and a blue sensitive color-forming unit, each of the color-forming units being comprised of an imagewise exposed, light-sensitive negative-working silver halide emulsion layer and associated therewith a sulfonamido-type dye-releasing redox agent of the formula:



wherein:

a. Dye is dye or dye precursor moiety which is diffusible when released from the dye-releasing redox agent;

b. Ballast is an organic ballasting radical of such molecular size and configuration as to render the sulfonamido-type dye-releasing redox agent nondiffusible during development in an alkaline processing composition;

c. G is OR or NHR$_1$ wherein R is hydrogen or a hydrolyzable moiety and R$_1$ is hydrogen or an alkyl group of 1 to 22 carbon atoms; and

d. *n* is a positive integer of 1 or 2 and is 2 when G is OR or when R$_1$ is hydrogen or an alkyl group of less than 8 carbon atoms;

with the further proviso that in the red-sensitized color-forming unit the Dye moiety is chosen to yield a cyan image dye, in the green-sensitized color-forming unit the Dye moiety is chosen to yield a magenta dye and in the blue sensitive color-forming unit the Dye moiety is chosen to yield a yellow image dye;

2. developing imagewise exposed silver halide in the silver halide emulsion layers to produce a silver image without concurrent release of the Dye moiety of the associated redox dye-releasing agent;

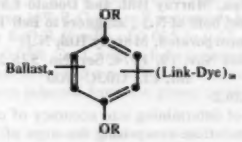
3. fogging residual silver halide in the silver halide emulsion layers;

4. developing the fogged residual silver halide in the silver halide emulsion layers and currently releasing the Dye moiety of the dye-releasing redox agents in the areas of the silver halide emulsion layers corresponding to those containing the fogged residual silver halide; and

5. permitting at least a portion of the released Dye moieties to diffuse to a dye image receiving means.

7. A process for producing a multicolor positive photographic transfer image which comprises:

1. providing an imagewise exposed photographic element comprising a support having coated thereon a red-sensitized color-forming unit, a green-sensitized color-forming unit and a blue sensitive color-forming unit, each of the color-forming units being comprised of an imagewise exposed, light-sensitive negative-working silver halide emulsion layer and associated therewith a hydroquinone-type dye-releasing redox agent of the formula:



wherein:

a. each R represents hydrogen or a hydrolyzable moiety;

b. Ballast is a photographically inert organic ballasting radical of such molecular size and configuration as to render the dye-releasing redox agent nondiffusible during development in an alkaline processing composition;

c. Dye is a dye or dye precursor moiety which is diffusible when released from the dye-releasing redox agent;

d. Link is an S, O or SO_2 group;

e. *n* is an integer of 1 to 3; and

f. *m* is an integer of 1 to 3;

with the further proviso that in the red-sensitized color-forming unit the Dye moiety is chosen to yield a cyan image dye, in the green-sensitized color-forming unit the Dye moiety is chosen to yield a magenta dye and in the blue sensitive color-forming unit the Dye moiety is chosen to yield a yellow image dye;

2. developing imagewise exposed silver halide in the silver halide emulsion layers to produce a silver image without concurrent release of the Dye moiety of the associated redox dye-releasing agent;

3. fogging residual silver halide in the silver halide emulsion layers;

4. developing the fogged residual silver halide in the silver halide emulsion layer and currently releasing the Dye moiety of the dye-releasing redox agents in the areas of the silver halide emulsion layers corresponding to those containing the fogged residual silver halide; and

5. permitting at least a portion of the released Dye moieties to diffuse to a dye image receiving means.

3,998,638

METHOD OF DEVELOPING OPAQUELY COATED SENSITIZED MATRIX WITH A SOLUTION CONTAINING SODIUM META-SILICATE

Douglas A. Griswold, Blossburg, Pa.; Harry L. Ormsby, Horseheads, and Harold D. Wilcox, Elmira, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 22, 1975, Ser. No. 579,755

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **3 Claims**

1. An improved method for establishing a light absorbing pattern on a screen substrate of a color television picture tube in which photosensitized polyvinyl alcohol, which becomes less soluble upon exposure to radiation, is first deposited onto the screen substrate and thereafter, exposing the sensitized coating to radiation in a predetermined pattern, developing the exposed sensitized polyvinyl alcohol coating and removing the unexposed areas of said coatings, applying to the substrate a coating of an opaque material to cover the exposed sensi-

tized polyvinyl alcohol and the exposed substrate surface, and chemically developing the opaquely coated exposed sensitized polyvinyl alcohol with a periodate compound containing aqueous developing solution to loosen and remove the coated exposed portions, while leaving the opaque coating on the screen substrate in the desired light absorbing pattern, the improvement wherein a predetermined amount of sodium meta-silicate is included in the developing solution.

3,998,639

METHODS FOR DETERMINING FEATURE-SIZE ACCURACY OF CIRCUIT PATTERNS

Martin Feldman, Murray Hill, and Donald Lawrence White, Bernardsville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 19, 1974, Ser. No. 525,210
Int. Cl.² G03C *5/00*
U.S. Cl. 96—36.2 **13 Claims**

1. Method of determining size accuracy of circuit patterns formed on a substrate comprising the steps of:

forming circuit patterns on the substrate and simultaneously forming on the substrate a test pattern comprising a plurality of light regions and a plurality of dark regions, said regions being substantially sufficiently small such that said test pattern appears as having a substantially continuous grey shade;

forming at least one reference pattern on the substrate in close proximity to the test pattern, the reference pattern constituting a reference grey shade corresponding to a predetermined size accuracy; and

comparing the grey shade of the test pattern to said reference grey shade thereby determining the size accuracy of the circuit patterns.

3,998,640

PHOTOGRAPHIC ELEMENTS CONTAINING N-OXIDE OXIDANTS

Samuel J. Ciurca, and Albert T. Brault, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 5, 1973, Ser. No. 367,305
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² G03C *7/00, 5/54, 1/48, 1/06*
U.S. Cl. 96—54 **18 Claims**

1. A photographic element comprising a support having thereon at least one photographic dye-image receiving layer and at least one layer containing at least 40 mg per ft² of an aromatic heterocyclic N-oxide oxidant having a polarographic reduction potential more positive than about −0.5 v when in an aqueous solution comprising 4% potassium hydroxide.

15. A photographic element comprising a support having thereon at least one photographic silver halide emulsion layer and at least 40 mg per ft² of an aromatic heterocyclic N-oxide oxidant having a polarographic reduction potential more positive than about −0.5 v when in an aqueous solution comprising 4% potassium hydroxide.

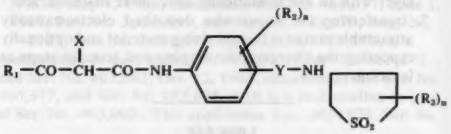
3,998,641

PHOTOGRAPHIC MATERIAL CONTAINING YELLOW COUPLERS

Karl-Wilhelm Schranz, Odenthal-Hahnenberg, and Friedrich-Wilhelm Kunitz, Leverkusen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Dec. 3, 1974, Ser. No. 529,038
Claims priority, application Germany, Dec. 10, 1973, 2361471
Int. Cl.² G03C *1/40*
U.S. Cl. 96—100 **5 Claims**

1. A light-sensitive photographic material having at least one silver halide emulsion layer and a diffusion-fast 2- or 4-equivalent yellow coupler with an active methylene group which may be substituted by a group capable of being split off during color development wherein the improvement comprises the coupler is a B-ketoacetanilide containing the 2-cyclotetramethylene sulfone group in the anilide portion of the following formula:



wherein:

Y is —CO—, —SO_2— or —NH—CO;

X is hydrogen or a group which can be split off;

n is an integer from 1 to 4;

R_2 H, halogen, cyanogen, alkoxy, aroxy, alkylthio, arylthio, dialkylamino or alkyl, the groups represented by R_2 being identical or different;

R_3 is H or alkyl;

m is 0, 1 or 2;

R_1 is alkyl of 1 to 32 C-atoms, alkoxy, alkyl, dicycloalkyl, a heterocyclic group or an aryl group which may be substituted with acyl, acyloxy, acylamino, amino, carboxyl, alkyl, alkoxy, aryl, aroxy, halogen or the groups selected of amino, carbamoyl, sulfamoyl or sulfonyl whereby one or both hydrogen atoms of the said groups may be replaced by identical or different aliphatic, araliphatic, or aromatic or heterocyclic groups.

3,998,642

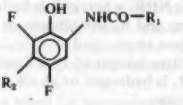
SILVER HALIDE EMULSIONS WITH INCORPORATED 4,6-DIFLUOROPHENOLIC COUPLERS

Philip T. S. Lau; Roy L. Orvis, both of Rochester, and Thomas E. Gompf, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 11, 1975, Ser. No. 594,988
Int. Cl.² G03C *1/40*
U.S. Cl. 96—100 **7 Claims**

1. In a light-sensitive silver halide emulsion comprising at least one hydrophilic colloid, silver halide and a phenolic color-forming coupler compound capable of forming a cyan dye upon reaction with oxidized aromatic amino color developing agent;

the improvement wherein said phenolic color-forming coupler is a compound having the structure:



wherein R_1 is a ballasting group of the type useful in incorporated color-forming couplers and R_2 is lower alkyl or H.

3,998,643

COMPOSITION AND METHODS FOR PROTECTING AND RENDERING NON-POROUS SURFACES WATER AND SOIL REPELLENT

Raymond Liddle, Waterford, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,310
Int. Cl.² C09K *3/18*
U.S. Cl. 106—2 **40 Claims**

1. A composition for treating non-porous substrates to protect and render the same water and soil repellent comprising the product resulting from the admixture of an alkyl poly-

siloxane fluid, an acid selected from the group consisting of sulfuric acid, phosphoric acid, an aromatic sulfonic acid, an aliphatic sulfonic acid and hydrochloric acid; and hydrofluoric acid.

3,998,644

ALKALI METAL SILICATE-ZINC HYDROXYCHLORIDE COATING COMPOSITION

James R. Lodge, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 358,030, May 7, 1973. This application Oct. 28, 1975, Ser. No. 625,858
Int. Cl.² C09D 5/14
U.S. Cl. 106—15 R 4 Claims

1. An inorganic coating composition comprising about 55 to 70 weight percent water, a water-soluble alkali metal silicate, and zinc hydroxychloride of the formula $Zn_5(OH)_8Cl_2$, in an amount of at least 0.5 mole for each mole of said alkali metal silicate, said composition upon being applied as a coating and dried at ambient temperatures of about 60° to 100° F. forming a hard, durable, water-insoluble, water-permeable, weather-resistant, inorganic, algicidal coating.

3,998,645

THERMOPLASTIC TRAFFIC PAINT

Hiroyuki Okazaki, Toyonaka, and Yasuyuki Suzuki, Ibaragi, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 450,684, March 13, 1974, abandoned. This application July 2, 1975, Ser. No. 592,624
Claims priority, application Japan, Mar. 16, 1973, 48-31125
Int. Cl.² C08F 45/66; E01F 9/08
U.S. Cl. 106—30 4 Claims

1. In a thermoplastic traffic paint containing at least one pigment, at least one filler and at least one natural and/or synthetic resin, the pigment being used in an amount of about 0.5 to 10% by weight based on the whole system, the filler being used in an amount of about 40 to 70% by weight based on the whole system, and the resin being used in an amount of about 20 to 30% by weight based on the whole system, an improvement which comprises using as the pigment a pigment containing 4,4-bis[acetoaceto-(2'',5''-dimethoxy-4''-chloro)-anilido-2-azo]-3,3'-dichlorodiphenyl and a white pigment, the mixing ratio by weight of 4,4-bis[acetoaceto-(2'',5''dimethoxy-4''-chloro)anilido-2-azo]-3,3'-dichlorodiphenyl to the white pigment being 5:95 to 95:5.

3,998,646

PROCESS FOR FORMING HIGH DENSITY SILICON CARBIDE

Gerald Q. Weaver, Princeton, Mass., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 522,428, Nov. 11, 1974, abandoned. This application Mar. 6, 1975, Ser. No. 555,855
Int. Cl.² C04B 35/52, 35/70
U.S. Cl. 106—44 9 Claims

1. A method for forming complexly shaped, dense silicon carbide articles comprising the steps of:

a. forming a green blank comprised of powdered silicon carbide having an average particle size distribution of approximately 50 to 100% by weight of silicon carbide of approximately 3 microns, and 0 to 50% by weight of silicon carbide of 30 to 170 microns;
b. lightly sintering and partially densifying said green blank;
c. shaping the lightly sintered blank to a desired machined configuration; and
d. fully sintering and densifying said machined blank.

3,998,647

REVERSIBLE LIGHT-SENSITIVE GLASS

Toshiharu Yamashita, Hachioji, and Tetsuro Izumitani, Hino, both of Japan, assignors to Hoya Glass Works, Ltd., Tokyo, Japan

Filed July 31, 1974, Ser. No. 493,430
Claims priority, application Japan, Dec. 29, 1973, 49-551
The portion of the term of this patent subsequent to Sept. 3, 1991, has been disclaimed.
Int. Cl.² C03C 3/26, 3/08
U.S. Cl. 106—54 1 Claim

1. A reversible light-sensitive glass comprising 100 parts of a base glass composition, in weight percent, of 48 to 62% SiO_2, 15 to 22% B_2O_3, 0 to 7% Al_2O_3, 0 to 10% ZrO_2, $6<Al_2O_3+ZrO_2<12\%$, 6 to 16% R_2O where R represents Li, Na or K, 0.5 to 7% BaO, a BaO/R_2O ratio of 0.035 to 0.65, 0 to 2% TiO_2, and 0.002 to 0.03% CuO, and as light-sensitive components, 0.15 to 1.0 part of Ag and more than the chemical Ag equivalent of halogens selected from the group consisting of Cl, Br and I.

3,998,648

MONOLITHIC REFRACTORIES

Stephen Whitney Thrower; George Hugh Criss, both of Bethel Park, and Daniel Eusebius Moniot, Glenshaw, all of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 8, 1975, Ser. No. 611,385
Int. Cl.² C04B 35/10
U.S. Cl. 106—67 4 Claims

1. A monolithic refractory batch composition comprising, by weight, about 45 to 55% of calcined bauxite, about 30 to 35% of calcined alumina, about 0.5 to 5% of bentonite, about 0.5 to 10% of kaolin clay, about 0.5 to 10% crude kyanite, said batch containing, based on its total weight, P_2O_5 in an amount equivalent to that provided by about 5 to 17% phosphoric acid of 85% concentration and a tempering fluid in an amount between about 2 and 19%.

3,998,649

PROCESS OF MANUFACTURING PORTLAND CEMENT CLINKER

Steven Gottlieb, East Hawthorn, Australia, assignor to Gorresens Inc., Chicago, Ill.

Filed Sept. 23, 1974, Ser. No. 508,428
Int. Cl.² C04B 7/44
U.S. Cl. 106—100 3 Claims

1. A process for the calcination of portland cement raw material components which comprises blending two separate mixes of clay and limestone each in a single stage crusher to provide separate high and low calcium content blends, feeding each said separate blend downwardly through correspondingly separate vertical calciners, drawing air upwardly through each said separate calciner and applying heat into both said calciners downwardly and countercurrently to the air flow, said applying of the heat being sufficient for substantially complete calcination of said blends, and mixing said completely calcined blends.

3,998,650

EXPANDED SYNTHETIC CALCIUM SILICATES

Carl Heinrich Schmitt-Henco, Mainz, and Eberhard Rauschenfels, Wiesbaden, both of Germany, assignors to Dyckerhoff Zementwerke A.G., Wiesbaden, Germany

Division of Ser. No. 317,021, Dec. 20, 1972, Pat. No. 3,928,058. This application Aug. 7, 1974, Ser. No. 495,371
Claims priority, application Germany, Dec. 21, 1971, 2163384; Sept. 9, 1972, 2244299
Int. Cl.² C04B 15/06
U.S. Cl. 106—118 5 Claims

1. A hydrothermally hardened silica concrete of the reaction product of a CaO component and an SiO_2 component, characterized in that the SiO_2 component is a previously ex-

panded synthetic calcium silicate comprising beads having a sphere-like structure, having an external sealing skin and numerous small non-intercommunicating air bubbles in the interior of the bead separated by thin walls, the concrete having a raw density of 0.7 to 1.4 g/cc, the CaO component being present in the proportions of about 5 to 25% and the expanded synthetic calcium silicate in the proportions of about 10 to 95% by weight.

3,998,651

COMPOUND OF CALCIUM CARBONATE AND OF TOBERMORITES, ITS MANUFACTURE AND ITS APPLICATIONS

Jacques Baudouin, Montelimar, and Jean-Pierre Caspar, Le Teil, both of France, assignors to Lafarge (Societe Anonyme), Paris Cedex, France

Filed Nov. 1, 1974, Ser. No. 520,103

Int. Cl.² C09C 1/02

U.S. Cl. 106—306 **9 Claims**

1. A composition of calcium carbonate and hydrated tobermorites, consisting of from about 70 to about 15 per cent by weight of tobermorites, which may contain an amount from 0 to 15 per cent by weight of free hydrated silica expressed as SiO_2, and of from about 30 to about 85 per cent by weight of calcium carbonate.

3,998,652

AQUEOUS PIGMENT DISPERSIONS

Volker Aign, Monheim; Klaus Waiz, Bergisch Neukirchen; Reinhold Hörnle, Cologne; Karlheinz Wolf, and Norbert Pusch, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

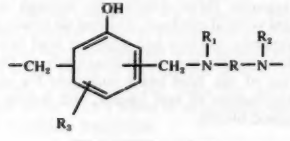
Filed Apr. 25, 1975, Ser. No. 571,864

Claims priority, application Germany, May 4, 1974, 2421606

Int. Cl.² C09C 3/08; C08J 3/00

U.S. Cl. 106—308 N **4 Claims**

1. Aqueous pigment dispersion containing an organic or inorganic pigment and a water-soluble oxyalkylation product of compound of recurring structural units of the formula



wherein

R denotes a C_2-C_{18}-alkylene radical optionally interrupted by O, S, NR_4, CO, arylene, or cycloalkyl, or denotes a C_5-C_7-cycloalkylene radical;

R_1 and R_2 independently of one another denote hydrogen, C_1-C_4-alkyl, or C_2-C_4-hydroxyalkyl; or conjointly denote a C_2-C_4-alkylene radical;

R_3 denotes hydrogen, C_1-C_{12}-alkyl, C_5-C_7-cycloalkyl, aryl, aralkyl, halogen, hydroxyl, C_1-C_{18}-alkoxy, carboxyl, or C_1-C_{18}-alkoxycarbonyl; and

R_4 denotes C_1-C_4-alkyl or C_2-C_4-hydroxyalkyl; prepared by condensing the corresponding phenolic compound, the corresponding amine and formaldehyde in the molar ratio of 1:0.5 – 3:1–4.

3,998,653

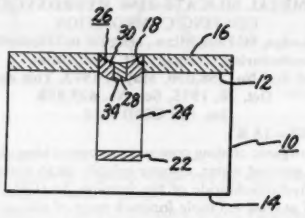
METHOD FOR CLEANING SEMICONDUCTOR DEVICES

Thomas R. Anthony; Harvey E. Cline, both of Schenectady, and Mike F. Chang, Liverpool, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,277

Int. Cl.² B08B 3/12

U.S. Cl. 134—1 **11 Claims**



1. A method for removing reaction products produced on surface areas of a silicon wafer by the reaction of molten aluminum with silicon oxide and silicon on said surface areas including the steps of

preparing a bath of a selective chemical etchant comprising a solution of potassium hydroxide in water wherein the concentration of the potassium hydroxide is from 2 to 67 percent by weight;

heating the bath to a temperature of at least 80° C;

placing said silicon wafer in the bath;

removing at least a portion of the reaction products and a selected portion of silicon base material from surface areas of the said wafer by selective chemical etching in the bath;

and removing a portion of the reaction products from said etched wafer by mechanical agitation.

3,998,654

METHOD OF REMOVING ADHESIVE

Dennis O. Falaas, St. Paul, Minn., and Joseph J. Whalen, Milwaukee, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 437,160, Jan. 28, 1974, abandoned. This application Jan. 27, 1975, Ser. No. 544,391

Int. Cl.² B08B 7/04

U.S. Cl. 134—4 **8 Claims**

1. A method for removing from substrate surfaces residual tacky pressure-sensitive adhesive containing reactive functional groups selected from the group consisting of carboxylic acid, anhydride, amine, nitrile, epoxy, alcohol, and amide functional groups, said method consisting essentially of the steps of:

a. applying to the residual adhesive a nonaqueous composition comprising a swelling agent for the adhesive in an amount sufficient to swell the adhesive and a polyvalent metal-containing chemical detackifying agent in an amount sufficient to chemically detackify the adhesive, said chemical detackifying agent being dissolved in the swelling agent whereby it is reactive with said reactive functional groups to thereby accomplish said chemical detackifying;

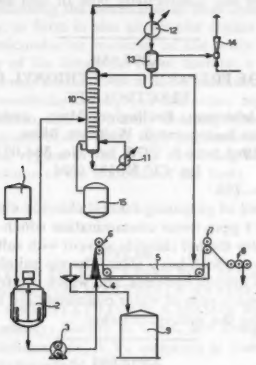
b. allowing the composition to remain in contact with the adhesive at ambient temperature for a time sufficient to swell and detackify the residual adhesive, and

c. removing the swollen and detackified adhesive with a cleaning tool.

3,998,655
METHOD FOR CLEANSING VINYL CHLORIDE POLYMERIZATION REACTORS

Gianni Benetta, Milan, and Francesco Testa, Bresso (Milan), both of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed July 23, 1975, Ser. No. 598,479
Claims priority, application Italy, Sept. 10, 1974, 27116/74
Int. Cl.² B08B 7/04
U.S. Cl. 134—12 14 Claims



1. A method for cleansing reactors used for polymerizing and copolymerizing vinyl chloride, which comprises:

dissolving polymeric incrustations including residual water, formed during polymerization and copolymerization of vinyl chloride on the inner walls of the reactors and on the relative equipments, with a solvent chosen from among the substituted amides, by contacting said incrustations with the solvent at a temperature above 60° C, said dissolving being carried out until the content in polymeric compound in the solution resulting from said dissolving reaches a value not exceeding 7% by weight;

concentrating the resulting solution by evaporation of a mixture of solvent and water, thereby to obtain a residual solution having a concentration in polymeric compound of from 10 to 30% by weight;

subjecting the vaporized mixture to fractional distillation, thereby to recover the solvent present in said mixture for further dissolution operations;

extruding the residual solution in the form of threads into an aqueous coagulating bath, thus extracting the solvent from said threads, and recovering the polymeric compound in the form of a spun product and the extracted solvent by fractional distillation from the solvent-enriched coagulating bath.

3,998,656
METHOD AND APPARATUS FOR CLEANING CYLINDRICAL AIR FILTERS

La Von P. Grotto, R.R. No. 3, Box 62, Litchfield, Minn. 55355

Filed Jan. 7, 1976, Ser. No. 647,105
Int. Cl.² B08B 7/00
U.S. Cl. 134—33 8 Claims

1. The jetless method of cleaning a hollow, cylindrical filter to remove particulate matter deposited on the outer surface thereof during normal use which comprises the steps of:

a. supporting the filter at one end for rotation about an axis;

b. centering the filter from the other end to bring the axis of the filter into coincidence with the axis of rotation;

c. lowering the pressure of the air outside the filter;

d. admitting ambient air to the inside of the filter through the centering means;

e. causing rotation of said filter, through the centering means, at a speed sufficient to exercise appreciable centrifugal force on particulate matter retained by said filter; and

f. collecting particulate matter drawn aerodynamically and thrown centrifugally from the outer surface of the filter.

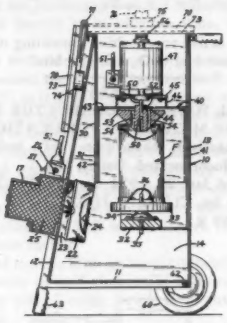
4. In combination:

a housing;

a platform in the housing rotatable about an axis;

an opening in said housing in line with said platform;

a closure unit slidable in and removable from said opening;



a motor on the outside of said closure unit having a drive shaft extending within said unit in line with the axis of rotation of said platform;

tapering drive means connected to said drive shaft within said unit, including at least one passage extending therethrough and generally aligned with said axis;

means connecting said passage with the air ambient to said housing;

and means for lowering the pressure in said housing to draw ambient air from said passage through said filter.

3,998,657
ELECTROCHEMICAL CELLS

James J. Auborn, Groton, Mass., and Richard D. Bezman, White Plains, N.Y., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 25, 1975, Ser. No. 599,273
Int. Cl.² H01M 43/06
U.S. Cl. 429—196 24 Claims

1. An electrochemical cell comprising an oxidizable active anode material; a cathode material; and an electrolytic solution between and in contact with said anode and said cathode, said electrolytic solution comprising an inorganic solvent material and a solute dissolved therein; said solvent material being electrochemically reduced upon the surface of said cathode material during discharge of said cell whereby elemental sulfur is formed as one of the reaction products; said electrolytic solution further including an additive in sufficient amount to dissolve all of said elemental sulfur which is formed during operation of said cell.

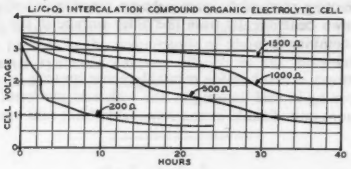
3,998,658
HIGH VOLTAGE ORGANIC ELECTROLYTE BATTERIES

Arabinda N. Dey, Needham, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Jan. 31, 1975, Ser. No. 545,955
Int. Cl.² H01M 43/00
U.S. Cl. 429—194 5 Claims

1. A non-aqueous electrolyte electrochemical cell essentially consisting of an active metal anode juxtaposed with and separated by separator means from a depolarizer containing a cathode active composition;

said separator means including a non-aqueous electrolyte absorbed therein;

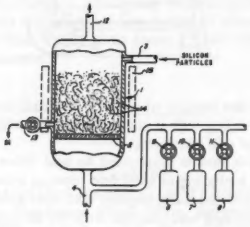


said cathode active composition consisting of the intercalation compound of CrO_3 and graphite.

3,998,659
SOLAR CELL WITH SEMICONDUCTOR PARTICLES AND METHOD OF FABRICATION

Gene Felix Wakefield, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 28, 1974, Ser. No. 437,278
Int. Cl.² H01L 31/02, 21/312
U.S. Cl. 136—89 R 11 Claims



1. A method of manufacturing a solar cell comprising setting a multiplicity of small semiconductor particles into a surface of a first insulating support layer to form a predetermined array of said particles partially embedded in said layer, said semiconductor particles each comprising an inner region of one conductivity type and an outer vapor deposited coating of opposite conductivity type; depositing a layer of conductive material overlying said first insulating layer and conforming to the surface contours of the said opposite conductivity type coatings of said particles; forming a first covering of insulating material over said first conductive layer between said particles to leave portions of said particles projecting from said insulating material; removing areas of said conductive layer and of said coating of opposite conductivity type from said projecting portions of said semiconductor particles to expose areas of said one conductivity type of said particles; forming a further covering of insulating material over said first covering of insulating material to leave smaller areas of said one conductivity type of said particles projecting from said further covering of insulating material; and depositing conductive material on said further covering of insulating material to conform to the surface contours of said smaller areas of said particles to selectively interconnect the said one conductivity type regions of said particles.

8. A solar cell comprising a multiplicity of semiconductor photodiodes comprising semiconductor particles partially embedded in a substantially flat surface of a first support layer of insulating material to form a predetermined array of said particles, said semiconductor particles each comprising an inner region of one conductivity type and an outer epitaxial layer of opposite conductivity type; portions of said semiconductor particles remote from said insulating layer having surface portions thereof removed to expose an area of the inner region surrounded by an area of said outer epitaxial layer; an electrically conductive layer on said insulating layer conforming to the contour of and electrically contacting the outer surfaces of the epitaxial layers of said semiconductor particles and providing a substantially flat surface between said particles; a second insulating material layer overlying said first conductive layer and said areas of said outer epitaxial layers of said particles to selectively expose areas of said regions of one conductivity type of said semiconductor particles, said exposed areas projecting from said third insulating material layer; and a second electrically conductive layer on said second insulating layer conforming to the contours of and selectively interconnecting said exposed areas of said projecting regions of one conductivity type of said semiconductor particles.

3,998,660
METHOD OF PREPARING DRY THIONYL CHLORIDE ELECTROLYTE

Sheldon I. Lieberman, Burlington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed June 5, 1975, Ser. No. 584,075
Int. Cl.² H01M 6/04
U.S. Cl. 429—196 5 Claims

1. A method of preparing thionyl chloride electrolyte having less than 1 ppm water contamination which comprises:

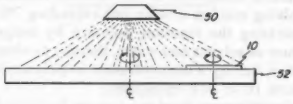
a. Mixing dry thionyl chloride solvent with sulfuryl chloride electrolyte which has a solute therein suitable for preparation of lithium batteries, and which electrolyte has less than about 1 ppm of water contamination therein,

b. Removing the sulfuryl chloride.

3,998,661
UNIFORM MIGRATION OF AN ANNULAR SHAPED MOLTEN ZONE THROUGH A SOLID BODY

Mike F. Chang, Liverpool; Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,671
Int. Cl.² H01L 21/228
U.S. Cl. 148—1.5 14 Claims



1. An improved method for migrating a molten zone through a solid body of semiconductor material comprising the process steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, a predetermined type conductivity, a predetermined level of resistivity, a preferred diamond cubic crystal structure, a preferred planar crystal orientation of (111) for at least the top surface, and a first preferred crystal axis of < 111 > and a vertical axis which are each substantially perpendicular to at least the top surface and substantially parallel with each other;

b. depositing a layer of metal of a predetermined thickness in the form of a metal wire having a predetermined annular configuration on the surface of (111) planar orientation;

c. placing the body on a supporting surface at a predetermined distance from a vertical axis thereof;

d. rotating the body simultaneously both in a non-centro symmetrical manner about the vertical axis of the supporting surface and about its own vertical axis;

e. heating the body and the deposited metal to a predetermined elevated temperature sufficient to form a melt of metal-rich semiconductor material on the surface of the body while continuing the simultaneous dual rotation cycle of the body;

f. establishing a temperature gradient substantially parallel with the vertical axis of the body and the preferred <111 > crystal axis of the crystal structure while continuing the simultaneous dual rotation cycle of the body, the surface on which the melt is formed being at the lower temperature, and

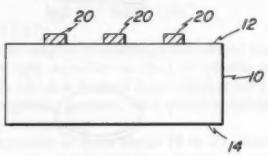
g. migrating each melt of metal-rich semiconductor material as a molten zone through the solid body of semiconductor material for a sufficient period of time to reach a predetermined distance into the body from the top surface, while continuing the simultaneous dual rotation cycle of the body, to form in situ an annular region of recrystallized semiconductor material of the body having solid solubility of the deposited metal therein, a substantially uniform cross-sectional area and a substantially uniform level of resistivity throughout the entire region and enclosing within, and electrically isolating from a portion of the remainder of the same type conductivity material, a cylindrical region of the body consisting of a predetermined volume of the material of the body.

3,998,662

MIGRATION OF FINE LINES FOR BODIES OF SEMICONDUCTOR MATERIALS HAVING A (100) PLANAR ORIENTATION OF A MAJOR SURFACE

Thomas R. Anthony; Harvey E. Cline, and Douglas E. Houston, all of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,674
Int. Cl.² H01L *21/228*
U.S. Cl. 148—1.5 **21 Claims**



1. An improved method for the migration of a molten zone through a solid body of semiconductor material to form a region comprising the process steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces being respectively the top and bottom surface thereof; a preferred crystallographic structure; a planar orientation of (100) for which at least the top surface thereof, a first selective type conductivity; a selected level of resistivity, and a vertical axis substantially aligned with the < 100 > axis of the crystal structure and which is also substantially perpendicular to the top surface;

b. depositing at least one mass of metal on the top surface of the body;

c. heating the body and the deposited metal to a preselected elevated temperature sufficient to form a melt of a metal-rich semiconductor material therein;

d. establishing a temperature gradient substantially parallel to the vertical axis of the body and the < 100 > axis of the crystal structure, the surface on which the melt is formed being at the lower temperature, and

e. migrating each melt of metal-rich semiconductor material as a molten zone through the solid body of semiconductor material for a sufficient period of time to reach a predetermined depth in the body from the top surface and to form a region of recrystallized semiconductor material of the body having solid solubility of the deposited metal therein, a substantially uniform cross-sectional area and a substantially uniform level of resistivity throughout the entire region.

3,998,663

WORKABLE NICKEL MATERIAL AND PROCESS FOR MAKING SAME

Berthold Wenderott, and Gerhard Köhlert, both of Altena, Germany, assignors to Vereinigte Deutsche Metallwerke AG, Frankfurt am Main, Germany

Filed Jan. 22, 1975, Ser. No. 542,932
Claims priority, application Germany, Jan. 30, 1974, 2404256; May 24, 1974, 2425271; Aug. 9, 1974, 2438381
Int. Cl.² C22F *1/10*
U.S. Cl. 148—2 **4 Claims**

1. A process for producing a nickel material having nickel oxide dispersed therein in its ultimate state, comprising the steps of:

a. forming a melt of nickel and oxygen and adjusting the oxygen content thereof so that said melt consists essentially of 0.01 to 0.25% by weight oxygen, elements having an affinity for oxygen selected from the group which consists of manganese, copper and iron, said elements present in elemental form and in amounts up to 0.3% by weight and wherein said elements are homogeneously miscible with nickel and cerium or rare earth elements in an amount of 0 to 0.3% the amount which will combine with a maximum of 20% of the oxygen contained in the melt, balance nickel;

b. casting said melt to form an ingot containing nickel oxide and the oxide of said element in addition to elemental nickel, the nickel oxide being in a eutectic with the nickel; and

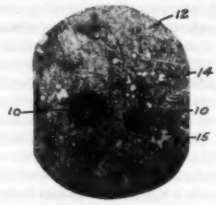
c. working said ingots to destroy the nickel-nickel oxide eutectic structure and to finely disperse the nickel oxide in the metallic structure of the worked body.

3,998,664

CAST IRON

Franklin B. Rote, 5902 Rickfield South, Jackson, Mich. 49203

Continuation-in-part of Ser. No. 378,827, July 13, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,616
Int. Cl.² B22D *25/06*
U.S. Cl. 148—3 **10 Claims**



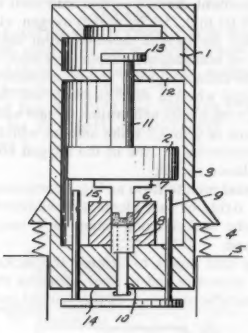
1. The method of producing a wear and abrasion resistant iron casting which comprises, melting an iron alloy consisting essentially of 2.5 to 3.10% carbon, 1.40 to 2.00% silicon, manganese, sulfur in an amount equal to about 0.02 to 0.4% in excess of that required to combine with all the manganese in the alloy and the balance iron, the carbon and silicon contents being selected to produce a carbon equivalent of 3.00 to 3.60%, the carbon equivalent being between 3.00 and 3.30 when the sulfur in excess of that required to combine with all the manganese is below 0.05%; casting said alloy in a sand mold to produce a white iron casting having a microstructure characterized by substantially all of the carbon being in the combined form and appearing as discrete particles of an iron sulfide-iron carbide complex in a pearlitic matrix; annealing the casting for a period of 2 to 20 hours at a temperatutre of between 1650° to 1850° F. to graphitize the iron and at least partially break down the iron sulfide-iron carbide particles; causing the iron sulfide particles so formed to grow in size by furnace cooling the casting down to a temperature of about 1500° to 1600° F. and subsequently cooling the casting to room temperature at a more rapid rate to produce a micro-

structure having a pearlitic or martensitic matrix containing graphite in the form of temper carbon and discrete particles of iron sulfide of generally rounded shape visible at a magnification of 100 diameters.

3,998,665
METHOD FOR PRESS WORK OF METALLIC MATERIALS

Yoshiki Oshida, Yokohama, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1974, Ser. No. 537,391
Int. Cl.² C21D 7/14, 9/48
U.S. Cl. 148—11.5 R **5 Claims**



1. A method for working a piece of metallic material which has at least one transformation point by making use of transformation super-plastic phenomena, comprising:

placing the piece of metallic material upon a lower die and peripherally confining the piece with a mould sidewall;

cyclically heating for a half cycle and cooling for a half cycle the piece of metallic material,

and in so doing, observing the following constraints:

1. each half-cycle during which the metallic material is heated, it is raised to a temperature that is from about 50° C to about 200° C above said transformation point, and each half-cycle during which the metallic material is cooled, it is lowered to a temperature that is from about 50° C to about 200° C below said transformation point;
2. the metallic material is subjected to at least three of these heating and cooling cycles,
3. each such cycle has a period of about 20 seconds,
4. the temperature is not held at its maximum and minimum value for any significant length of time; and further including:

simultaneously with the cyclical heating and cooling, applying an upper die upon the piece of metallic material, in opposition to the lower die, and forcing one die toward the other sufficiently to apply to the piece of metallic material a light mechanical load of up to about 1/20 to 1/10 the yielding stress of said material.

3,998,666
SUBSCALE REACTION STRENGTHENING OF LOW CARBON FERROUS METAL STOCK

Lee J. Cuddy, Monroeville Borough, and Harry H. Podgurski, Greensburg, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed July 30, 1975, Ser. No. 600,754
Int. Cl.² C21D 1/48
U.S. Cl. 148—16.6 **14 Claims**

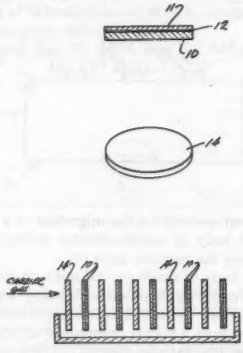
1. A process for the diffusion-reaction strengthening of ferrous metal stock consisting essentially of, in wt. %, 0.001 to 0.02% carbon, 0.02 max. % nitrogen, 0.02 max. % oxygen, 0.05 to 0.5% available strong nitride forming metal, selected from the group IVB and VB elements and mixtures thereof, with the balance iron and residual steelmaking elements, which comprises,

at a temperture within the range of 450° to 590° C, nitrogenating said stock for a time at least sufficient to diffuse a nitride subscale front to a distance from a stock surface, which is at least 25% of the thickness of said stock, said nitrogenation being conducted in an atmosphere having a nitrogen activity (i) sufficient to diffuse nitrogen into said stock and form said subscale front, but (ii) below that which will lead to the formation of iron nitride during said nitrogenation.

3,998,667
BARIUM ALUMINOBOROSILICATE GLASS-CERAMICS FOR SEMICONDUCTOR DOPING

James E. Rapp, Oregon, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 534,860, Dec. 20, 1974, Pat. No. 3,962,000, which is a continuation-in-part of Ser. No. 431,212, Jan. 7, 1974, Pat. No. 3,907,618. This application Dec. 19, 1975, Ser. No. 642,287
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.² H01L 21/223
U.S. Cl. 148—22 **5 Claims**



1. A glass-ceramic dopant host for vapor phase transport of B_2O_3 at elevated temperatures prepared by the thermal in-situ crystallization of thermally crystallizable glass compositions consisting essentially of:

Components	Mole %
SiO_2	40 < to 60
Al_2O_3	10 to 30
B_2O_3	20 to 40
BaO	1 to 15
Alkaline earth oxides selected from the group consisting of BaO, MgO, CaO, SrO, and mixtures thereof	3 to 20

Wherein $4 \geq \frac{Al_2O_3}{\text{Alkaline earth oxides}} \geq 1.5$

3,998,668

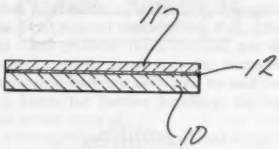
ALUMINUM METAPHOSPHATE DOPANT SOURCES

Jack M. Florence, and William E. Smith, both of Sylvania, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 427,380, Dec. 21, 1973, abandoned, which is a division of Ser. No. 305,548, Nov. 10, 1972, Pat. No. 3,841,927. This application Mar. 18, 1976, Ser. No. 667,939

Int. Cl.² H01L *21/225*

U.S. Cl. 148—22 18 Claims



1. A sintered and porous body consisting essentially of aluminum metaphosphate.

3,998,669

PERMANENT MAGNET ON THE BASIS OF COBALT-RARE EARTH ALLOYS AND METHOD FOR ITS PRODUCTION

Karl Strnat, Fairborn, Ohio, assignor to Th. Goldschmidt AG, Essen, Germany

Continuation-in-part of Ser. No. 507,868, Sept. 20, 1974, abandoned, which is a continuation of Ser. No. 397,313, Sept. 14, 1973, abandoned, which is a continuation of Ser. No. 207,867, Dec. 14, 1971, abandoned. This application Aug. 14, 1975, Ser. No. 604,534

Int. Cl.² H01F *1/04*

U.S. Cl. 148—31.57 18 Claims

1. A permanent magnet exhibiting pronounced ductility and mechanical strength superior to that of plastic or rubber-bonded magnets which is formed from compacted particles of at least one magnetic powder, said powder being a cobalt rare-earth alloy comprising:

a. a first component of from about 10 to 25 atomic % of at least one rare-earth selected from the group consisting of Y, Sc, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

b. a second component of from about 75 to 90 atomic % of cobalt alone or in mixture with one or several metals selected from the group consisting of Cu, Fe, Mn and Ni, said cobalt being present in an amount of from 50 to 100% of said second component;

c. said particles being internally soldered by a third component of at least about 9% to 25% by weight of said first component and said second component of a metallic solder selected from the group consisting of tin-lead solders, tin, lead, tin modified by silver, antimony or indium; lead modified by tin, silver, antimony or indium; indium-rich solders and Wood's metal, said metallic solder having a melting point below 400° C.

3,998,670

PROCESS FOR PRODUCING STEEL PLATE SUBSTRATES FOR LACQUERING

Akimi Umezono; Minoru Kitayama; Takao Saito, and Ryousuke Wake, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

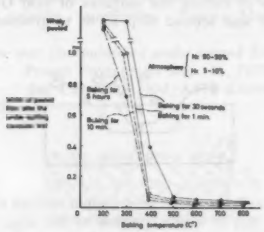
Continuation of Ser. No. 355,662, April 30, 1973, abandoned. This application May 29, 1975, Ser. No. 581,780

Claims priority, application Japan, May 4, 1972, 47-44417; Mar. 20, 1973, 48-32241

Int. Cl.² C23C *1/10*

U.S. Cl. 148—6.2 2 Claims

1. A method for producing a steel plate substrate suitable for lacquering which comprises applying to the surface of the steel plate a treating solution consisting essentially of 5 to 150 g/l of chromic acid, 5 to 200 g/l as oxide of a metal oxide sol of silicon or aluminum, and 5 to 100 g/l of one or more compounds selected from the group consisting of nitrates, acetates, carbonates, and hydroxides, of a metal selected from the group consisting of nickel, chromium (III), zinc, and copper, borax, molybdate and tungstate, and then baking the sheet at a temperature of at least 400° C.



3,998,671

PROCESS FOR THE MANUFACTURE OF A WATCH CASE WITH A VISIBLE HIGHLY INVARIABLE SURFACE

Ulrich Irion, Selzach, Switzerland, assignor to A. Schild S.A., Grenchen, Switzerland

Filed Dec. 18, 1973, Ser. No. 425,777

Claims priority, application Switzerland, Jan. 5, 1973, 105/73

Int. Cl.² B22F *3/00*

U.S. Cl. 148—126 6 Claims

1. Process for the manufacture of a watch case or like workpiece having a surface highly resistant to wear and corrosion, said surface having a hardness of at least 1300 kp/mm², comprising the steps of;

a. pressing and sintering a powdered metal mixture comprising at least one base powdered metal selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, and tungsten, in admixture with at least one binder powdered metal selected from the group consisting of copper, silver, gold, iron, cobalt, nickel, ruthenium, rhodium, palladium, ormium, iridium and platinum, the proportion of said binder metal in said mixture being not more than about 15% of the total weight, at a temperature between about 1400° and about 1500° C to produce a substantially poreless unfinished workpiece;

b. forming said unfinished workpiece into finished shape by cutting and milling, and polishing the faces thereof;

c. subjecting the finished workpiece formed in step (b) to a surface hardening treatment at a temperature of about 950° C to transform at least a part of the metal in the surface to borides, carbides, or nitrides;

3,998,672

METHOD OF PRODUCING INFRARED LUMINESCENT DIODES

Tadahiko Miyoshi, Hitachi; Yasutoshi Kurihara, Katsuta, and Mitsuru Ura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 30, 1975, Ser. No. 645,328

Claims priority, application Japan, Jan. 8, 1975, 50-4430

Int. Cl.² H01L *21/208*

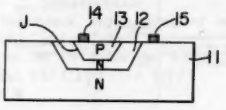
U.S. Cl. 148—171 5 Claims

1. A method of producing an infrared luminescent diode using gallium arsenide, comprising

a first step of forming a recess in one of the principal surfaces of a GaAs substrate;

a second step of growing a first Si-doped N-type GaAs layer and a second Si-doped P-type GaAs layer continuously on said one principal surface of said substrate and on the surface of said recess by bringing said substrate into contact with a Ga melt containing GaAS and Si;

a third step of cutting the surfaces of said GaAs layers formed in said second step so as to generate a plane



almost parallel to said one principal surface of said substrate so that at least a portion of the edge of the PN junction formed between said first and second GaAs layers can be exposed in said plane; and

a fourth step of bringing a first and a second electrodes in ohmic contact with the portions respectively of said first and second layers on both sides of said edge of said PN junction in said plane where said PN junction is exposed.

3,998,673

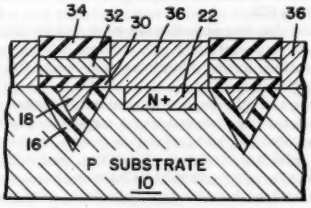
METHOD FOR FORMING ELECTRICALLY-ISOLATED REGIONS IN INTEGRATED CIRCUITS UTILIZING SELECTIVE EPITAXIAL GROWTH

Pel Chow, 539 Keelson Circle, Redwood City, Calif. 94065

Filed Aug. 16, 1974, Ser. No. 498,011

Int. Cl.² H01L *21/76, 21/20*

U.S. Cl. 148—175 **7 Claims**



1. A method for forming electrically-isolated regions in a semiconductor substrate of a first conductivity type comprising the steps of first, etching notches in said substrate surrounding said isolated regions, second, depositing a silicon dioxide layer on the surface of said substrate, third, growing polycrystalline silicon on the surface of said substrate to fill said notches, fourth, lapping substantially to the surface of said substrate to re-expose said substrate at said isolated regions, fifth, forming isolation junctions of opposite conductivity type in said substrate at said isolated regions, sixth, forming dielectric mesas on said notches, and seventh, selectively growing an epitaxial layer of said opposite conductivity type on the surface of said substrate only at said isolated regions between said mesas.

3,998,674

METHOD FOR FORMING RECESSED REGIONS OF THERMALLY OXIDIZED SILICON AND STRUCTURES THEREOF UTILIZING ANISOTROPIC ETCHING

Donald P. Cameron, and Paul J. Tsang, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,571

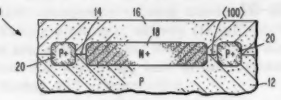
Int. Cl.² H01L *21/76, 21/20*

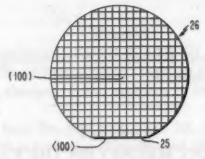
U.S. Cl. 148—175 **6 Claims**

1. An improved method for forming a recessed thermal SiO_2 isolation region in a monocrystalline silicon semiconductor body having a major surface lying in a (100) plane, as defined by the Miller indices, comprising

forming an etch resistant and oxidation resistant masking layer on said major surface of said body,

forming at least one rectilinear annular opening in said





masking layer, said opening being oriented with the sides parallel to the [100] directions on said major surface,

removing a portion of the exposed body by anisotropic chemical etching,

oxidizing the resultant exposed portions of said body until the surface of the resultant SiO_2 and major surface are substantially co-planar.

3,998,675

METHOD OF DOPING A SEMICONDUCTOR BODY

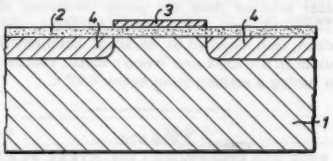
Werner Langheinrich, Ulm, Donau; Max Kuisl; Anton Sturmer, both of Neu-Ulm, and Friedrich Lammel, Ulm (Danube), all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Nov. 11, 1975, Ser. No. 630,891

Claims priority, application Germany, Nov. 16, 1974, 2454412

Int. Cl.² H01L *21/223*

U.S. Cl. 148—189 **11 Claims**



1. A method of doping a semiconductor body by diffusion from the gaseous phase in which centres of impurity are diffused into a limited region of one side of the surface of a semiconductor body, characterized by coating the surface over its entire area with a layer through which the doping material is capable of diffusing; and providing this layer with a reducing agent at those points at which doping is not desired in the semiconductor body, said reducing agent reducing the doping material, from its form in the gaseous atmosphere to the elemental form.

3,998,676

METHOD FOR BOMB MANUFACTURE

Richard A. Plauson, deceased, late of China Lake, Calif.; by Mary E. Plauson, legal representative, Ridgecrest, Calif., and William McBride, Williamsburg, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 29, 1974, Ser. No. 492,637
Int. Cl.² C06B *45/34, 45/30, 33/00, 27/00*
U.S. Cl. 149—7 1 Claim

1. In a process for manufacturing bombs wherein aluminum particles, other ingredients, and a waxy composition comprising by weight 84±3 percent desensitizing wax, 2±0.15 percent lecithin, and 14±1 percent nitrocellulose, are deposited in predetermined quantities from separate hoppers and combined on a conveyor belt and delivered by said conveyor belt to a melting kettle for further handling, the improvement which resides in the steps of:

melting a predetermined quantity of said waxy composition in a crucible means,

combining with said molten waxy composition a predetermined quantity of separate aluminum particles to achieve a mixture that is by weight within the range of from 82 to 98 percent aluminum,

stirring said separate aluminum particles and waxy composition mixture with stirring means until a uniform aluminum particulate distribution is achieved in said mixture,

cooling said mixture until said waxy composition solidifies and forms a separate coating on each of said separate aluminum particles in said mixture,

placing said separate waxy composition coated aluminum particles in a dispensing hopper, and

dispensing said separate waxy composition coated aluminum particles from said hopper directly onto said conveyor belt in predetermined quantities and at appropriate times for further processing in the manufacture of bombs, for eliminating the dangers of fire and explosion presented by aluminum particles when exposed to air.

3,998,677

TECHNIQUE FOR USING SOLDER ETCH RESIST IN GENERATION OF PATTERNS ON PRINTED WIRING BOARDS

David Verne Anderson, North Andover; Anthony John Cucinotta, Wakefiled, both of Mass., and Donald Lee Durand, Plaistow, N.H., assignors to Western Electric Company, Inc., New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 21, 1974, Ser. No. 525,778
Int. Cl.² C23F *1/02*
U.S. Cl. 156—3 3 Claims

1. A method for etching a copper surface which comprises the steps of

a. depositing a resist upon a copper surface in a pattern, exposed copper being destined for etching, the resist being a solder cream comprising a slurry of solder particles suspended in a flux vehicle comprising a rosin, an active hydrogen containing compound and curing agent, the vehicle comprising from 80–85% by weight of the solder cream,

b. curing the solder cream at a temperature ranging from 170°–200° F, and

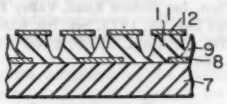
c. etching exposed copper.

3,998,678

METHOD OF MANUFACTURING THIN-FILM FIELD-EMISSION ELECTRON SOURCE

Shigeo Fukase, Uenohara, and Ushio Kawabe, Hamura, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 20, 1974, Ser. No. 453,031
Claims priority, application Japan, Mar. 22, 1973, 48-31759
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² C23F *1/04;* A47B *88/00*
U.S. Cl. 156—3 20 Claims



1. A method of manufacturing a thin-film field-emission electron source, comprising the steps of:

a. selectively forming a first layer of electrically conductive material on the surface of a substrate;

b. forming a second layer of electron emissive material over the entire surface of said substrate and said selectively formed first layer;

c. selectively removing prescribed portions of said second layer of material, so as to leave at least one emitter tip portion of electron emissive material having a prescribed shape on said first layer;

d. replacing prescribed portions of said second layer removed in step (c) with a third layer of electrically insulating material;

e. selectively removing a predetermined portion of said third layer around said at least one emitter tip portion to expose at least a portion of said at least one emitter tip portion; and

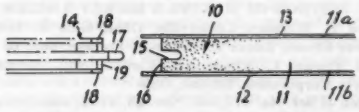
f. selectively forming a fourth layer of electrically conductive material on the surface of said third layer at locations other than the area directly overlying the top of said at least one emitter tip portion to porvide an accelerating anode layer on said third layer.

3,998,679

METHOD OF APPLYING REINFORCING STRIPS TO THE EDGES OF BUILDING BOARDS

Thomas Gwynne, Loughborough, England, assignor to BPB Industries, Inc., London, England

Continuation of Ser. No. 475,346, May 31, 1974, abandoned, which is a division of Ser. No. 270,394, July 10, 1972, Pat. No. 3,849,235. This application Sept. 8, 1975, Ser. No. 611,119
Int. Cl.² B32B *31/18, 3/04, 3/02;* E04B *2/32*
U.S. Cl. 156—42 2 Claims



1. In the process for the production of reinforced board having a cementitious set core faced with facing sheets, the steps comprising:

cutting back the set core along at least one edge there to leave said facing sheets projecting therefrom beyond the edge of the core;

providing a reinforcing strip having a single projection adapted to be directed toward the core with one face of said strip being outwardly directed;

cutting said cut back edge of the core to form a single recess having a profile to accommodate the projection of said reinforcing strip and inserting said projection into said recess;

returning at least one of the projecting edges of said facing sheets over at least a part of said outwardly directed face of the strip; and

adhesively securing said facing sheet edge to said face.

3,998,680

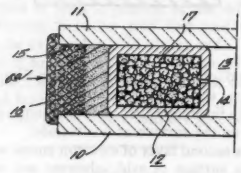
METHOD OF FABRICATING INSULATING GLASS UNITS

Theodore R. Flint, Jug Hollow Road, Valley Forge, Pa. 19481

Filed Oct. 28, 1975, Ser. No. 626,230

Int. Cl.² C03C *27/00;* **E06B** *3/24*

U.S. Cl. 156—109 **3 Claims**



1. A method of fabricating an insulating glass unit which comprises

disposing a spacing member between panes of glass adjacent the edges thereof to hold said panes in a predetermined spaced relation, the spacing member and glass panes cooperating to provide a channel about the periphery of the assembly,

applying a partially crosslinked hot-melt butyl rubber sealant composition into said channel, said sealant being in continuous contact with said glass panes and spacing member and of a type such that substantially complete crosslinking will occur when the composition is heated to from about 325° to about 425° F., and

applying sufficient heat to the exterior face of said sealant composition to raise the temperature of the outermost portion of the sealant composition to from about 325° to about 425° F. while the innermost portion of the sealant composition remains at a temperature substantially below about 325° to about 425° F. thereby causing substantially complete crosslinking of that portion of the sealant composition heated to from about 325° to about 425° F. forming a high-strength thermoset bond about the outer periphery of the channel while the innermost portion of the sealant composition adjacent the spacing member remains partially crosslinked providing a high tack, adhesive bond about the inner periphery of the channel.

3,998,681

METHOD OF MAKING A HICKEY ROLLER

Leland E. Williams, Centerville, Ohio; Glen B. Meredith, Three Rivers; James R. Ungurait, Portage, both of Mich., and Thomas C. Rhodarmer, Canton, N.C., assignors to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 419,848, Nov. 28, 1973, abandoned. This application July 7, 1975, Ser. No. 593,902

Int. Cl.² B32B *25/02;* **B29H** *9/11;* **B32B** *5/08*

U.S. Cl. 156—154 **10 Claims**

1. A method of making a hickey roller comprising the steps of, providing an elastomeric matrix material having elongated substantially parallel fibers therein, supporting said elastomeric matrix material on a cylindrical support to define a roller having a longitudinal axis and having an outer tubular portion, said supporting step also serving to arrange said fibers approximately parallel to said longitudinal axis, curing said outer portion in a moisture-free environment to define a cured elastomeric matrix having said fibers embedded therein with each fiber having a cohesive strength which is greater than the cohesive strength of said elastomeric matrix and each of said fibers also having a cohesive strength which is greater than the adhesive force holding each fiber in said elastomeric matrix, and machining said outer portion to remove elastomeric matrix from and thereby expose portions of said fibers which are arranged radially outwardly of a cylindrical surface defined by machining while radially inwardly arranged portions of said fibers are held inwardly of said cylindrical surface by said elastomeric matrix whereby said exposed outer portions of said fibers extend outwardly from said cylindrical surface to define a brush-like construction for said hickey roller, said machining step resulting in comparatively large increments of the exposed outer portions of said fibers being engaged and temporarily moved transverse said longitudinal axis in a non-shearing manner due in large measure to said fibers having said cohesive strength which is greater than the cohesive strength of said elastomeric matrix, said exposed outer portions returning essentially to their original positions following said machining step to define said brush-like construction.

3,998,682

METHOD AND DEVICE FOR WELDING POLYOLEFINIC OBJECTS

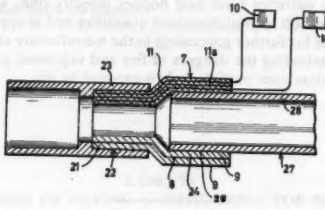
Gerhard Harmsen, Hardenberg, Netherlands, assignor to Wavin B.V., Zwolle, Netherlands

Filed Nov. 22, 1974, Ser. No. 526,417

Claims priority, application Netherlands, Nov. 27, 1973, 7316221

Int. Cl.² B29C *27/06*

U.S. Cl. 156—158 **8 Claims**



1. A method of welding two polyolefinic surfaces, each comprised of a material having a respective melt-flow index, the material of the first surface having a higher melt-flow index than the material of the second surface and the materials of both surfaces having different melting points; said method comprising the steps of:

heating the first surface to a predetermined temperature and for such time that the material of the first surface has a predetermined flow behavior characteristic;

heating the second surface to a predetermined temperature and for such time that the material of the second surface has a flow behavior characteristic substantially equal to the predetermined flow behavior characteristic;

moving the heated surfaces when they are at substantially equal flow behavior characteristics into abutment so as to cause the materials of the surfaces to weld.

3,998,683

METHOD OF MAKING INSULATING BOARD

James W. Benton, 48871 Denton Road, Belleville, Mich. 48111

Continuation of Ser. No. 420,604, Nov. 30, 1973, abandoned. This application May 19, 1975, Ser. No. 578,674

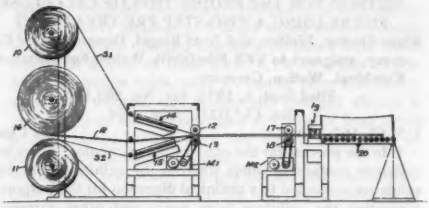
Int. Cl.² B32B *31/08*

U.S. Cl. 156—164 **3 Claims**

1. The method of making laminated insulated board which comprises

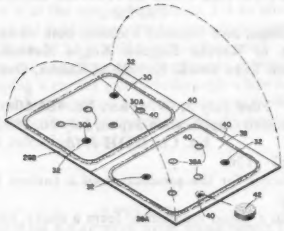
continuously removing fibrous sheets from rolls,

continuously moving said fibrous sheets through heat zones sufficient to raise the temperature of the sheet above the melting point of the foamed thermoplastic sheet to which the fibrous sheets are to be applied,
continuously removing a foamed thermoplastic sheet from a roll at ambient temperature,
continuously moving said foamed thermoplastic sheet between said heated fibrous sheets,
applying said heated fibrous sheets to the surface of the foamed thermoplastic sheet to form an assembly,
continuously moving said assembly through a first set of



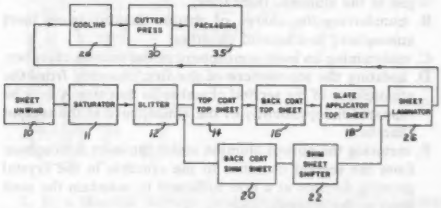
rolls to apply pressure to said assembly sufficient to reduce the cross section of the assembly,
continuously moving said assembly directly from said first set of rolls through a second set of rolls at a point spaced longitudinally downstream from said first set of rolls,
rotating said second set of rolls at a speed greater than said first set of rolls to subject said assembly to longitudinal tension,
controlling the temperature and speed such that said assembly being soft and thermoplastic as it leaves said second set of rolls,
and thereafter permitting said assembly to cool.

3,998,684
METHOD OF MANUFACTURING AIR CUSHIONS
Kenneth L. McRight, 7456 S. Oswego, Tulsa, Okla. 74136
Filed Jan. 12, 1976, Ser. No. 648,523
Int. Cl.² B32B *31/00, 7/14*
U.S. Cl. 156—253 **6 Claims**



1. A method of manufacturing an air cushion comprising the steps of:
1. cutting two pieces from an uncured rubber sheet, the dimension of the pieces being greater than the ultimate dimensions of the cushion;
2. positioning the pieces one on top of the other;
3. placing and centering a stencil board on top of the stacked pieces, the stencil having spaced openings therein;
4. punching two openings in said pieces using said openings in said stencil as guides;
5. separating the two pieces;
6. placing said stencil board on the first piece using the openings therein as guides and applying adhesive to the sheet around the periphery of the stencil and through the openings therein, the stencil board thereafter being removed;
7. placing a stencil paper on the other piece, the stencil paper being of the same dimensions with the same openings therein as said stencil board, the stencil paper being positioned by alignment with the openings in the sheet;
8. applying adhesive to the second piece around the periphery of the stencil paper and through the openings in the stencil paper;
9. punching a valve hole in the second piece;
10. repositioning the second piece onto the first piece, the adhesive areas of each contacting the other and with the stencil paper being therebetween;
11. punching additional holes in the stacked pieces, the punched holes being centered with the holes in the stencil paper;
12. trimming the periphery of the stacked pieces, the trimmed periphery being exteriorly of the stencil paper;
13. rolling the stacked pieces to firmly contact the two together;
14. applying adhesive to the flanged base of a tubing valve and positioning the same over the valve hole in the second piece;
15. vulcanizing the stacked pieces to bond the contacting portions together, the periphery and the openings in the paper stencil defining the areas which are bonded together; and
16. inserting a valve core into the valve tube, the vulcanized pieces being then ready to receive and retain air therebetween to provide a vented cushion.

3,998,685
APPARATUS AND PROCESS FOR MAKING AN OFFSET LAMINATED ROOFING SHINGLE AND ROOFING SHINGLE MADE THEREBY
Edward S. Czyzewski, St. Petersburg; Donald C. Portfolio, Tampa; Lee Schuster, Clearwater, and Louis M. Wisner, Largo, all of Fla., assignors to The Celotex Corporation, Tampa, Fla.
Continuation of Ser. No. 455,991, March 29, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 658,908
Int. Cl.² B32B *31/00*
U.S. Cl. 156—260 **5 Claims**



1. The method of making a roofing shingle from an asphalt saturated felt in continuous process from felt unwind to individual roofing shingles comprising the steps of thoroughly saturating said felt with a bituminous liquid, longitudinally cutting said felt into a first sheet having a top side and an underside and a second sheet having a top side and an underside, laterally shifting one of said sheets with respect to the other of said sheets in spaced overlying relationship so that each of said sheets has its centerline coincident with the centerline of the other of said sheets and so that the underside of said first sheet faces the top side of said second sheet, applying a continuous surface coating of molten bitumen to both sides of said first sheet, applying a continuous surface coating of molten bitumen to said underside only of said second sheet, applying a coating of granules to the top side of said first sheet, laminating said sheets together to form a unitary layered sheet, with at least one of said sheets being laminated over its full surface area to the other of said sheets, cutting said lay-

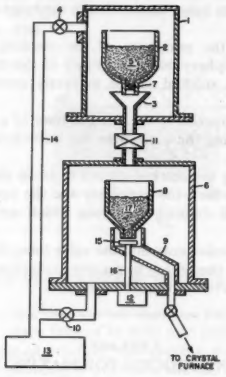
ered sheet into pieces having interdigitating tabs, and separating said pieces for packaging.

3,998,686

SAPPHIRE GROWTH FROM THE MELT USING POROUS ALUMINA RAW BATCH MATERIAL

Gerald S. Meiling, and Walter L. Morgan, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 10, 1975, Ser. No. 556,651
Int. Cl.² B01J *17/18*; C01F *7/02*
U.S. Cl. 156—617 R 4 Claims



1. A method of growing substantially monocrystalline highly transparent alumina bodies on a seed crystal from the melt and using a polycrystalline, porous alumina raw batch material to continuously replenish the melt during successive growth cycles comprising the steps of:

A. vacuum degassing a charge of the porous alumina raw batch material in a first chamber at a temperature sufficient to substantially eliminate adsorbed water and oxygen in the alumina, thereafter,

B. transferring the charge of porous alumina in an inert atmosphere to a second chamber,

C. maintaining an inert atmosphere in the second chamber,

D. isolating the atmosphere of the first chamber from the atmosphere of the second chamber so that step A may be repeated independently of the atmosphere of the second chamber,

E. metering the porous alumina under the inert atmosphere from the second chamber to the crucible in the crystal growing furnace at a rate sufficient to maintain the melt level in the crucible, and

F. growing substantially monocrystalline alumina bodies from the melt in the crystal growing furnace.

3,998,687

TECHNIQUE FOR GROWTH OF THIN FILM LITHIUM NIOBATE BY LIQUID PHASE EPITAXY

Albert Anthony Ballman, Woodbridge, and Ping King Tien, Chatham Township, Morris County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 10, 1975, Ser. No. 557,106
Int. Cl.² B01J *17/18*
U.S. Cl. 156—619 1 Claim

1. Technique for the liquid phase epitaxial growth of thin film lithium niobate which comprises the steps of immersing lithium tantalate substrate seed crystal into a supercooled melt of a flux consisting of $Li_2B_2O_4$ — $Li_2Nb_2O_6$ wherein the mole percent of $Li_2Nb_2O_6$ ranges from 10–100 percent and withdrawing the seed crystal from the melt and effecting cooling thereof, so resulting in supersaturation of the melt solution on the seed and growth of a layer of lithium niobate.

3,998,688

METHOD FOR THE PRODUCTION OF CELLULOSE FIBERS USING A TWO-STEP PRE-TREATMENT

Klaus Fischer, Wolfen, and Josef Ringel, Dessau, both of Germany, assignors to VEB Filmfabrik Wolfen-Fotochemisches Kombinat, Wolfen, Germany

Filed Sept. 4, 1974, Ser. No. 503,192
Int. Cl.² D21C *1/00*, *1/06*
U.S. Cl. 162—50 17 Claims

1. In the process for the preparation of cellulose fibers from cellulose containing solids wherein the cellulose containing solids are subjected to a chemical digestion for the purpose of separating the cellulose from lignin and other extraneous chemicals, the improvement which comprises prior to digestion of said solids subjecting said solids to a two-step pre-treatment by:

1. in a first step contacting said solids with an aqueous solution of sodium, potassium, lithium, calcium, barium, magnesium or ammonium sulfite or bisulfite and mixtures thereof for 0.5 to 60 minutes at temperatures of 10° to 60° C., and

2. in a second step irradiating the first step pre-treated solids by contacting them with charged particles, whereby the solids which are the product of said pre-treatment yield a pulp of lower lignin content and increased whiteness after the solids have been digested than cellulose containing solids without said pre-treatment.

3,998,689

PROCESS FOR THE PRODUCTION OF CARBON FIBER PAPER

Teruaki Kitago, and Tadaaki Yoshida, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo and Toyo Boseki Kabushiki Kaisha, Osaka, both of, Japan

Filed July 3, 1974, Ser. No. 485,606
Claims priority, application Japan, July 10, 1973, 48-77729
Int. Cl.² D21H *1/48*
U.S. Cl. 162—136 8 Claims

1. A process for the production of a carbon fiber paper, comprising:

mixing, in a liquid medium to form a slurry, carbon fibers, pulp, organic fibers having a carbonaceous yield of not less than 20% and a paper sheet binder in relative amounts such that the ratio of the carbon fibers to the pulp falls in the range of 40–90% by weight of carbon fibers to 60–10% by weight of pulp, the ratio of the organic fibers to the combined weight of said carbon fibers and pulp falls in the range of from 5 to 20% by weight and the ratio of the paper sheet binder to the combined weight of said carbon fibers, pulp and organic fibers falls in the range of from 5 to 50% by weight;

shaping the resultant mixture into the form of sheet to produce a mixed sheet;

impregnating the mixed fiber sheet with an organic high molecular weight substance; and then

baking the impregnated sheet at a temperature of not less than 800° C. in atmosphere of an inert gas to carbonize the sheet.

3,998,690

FIBROUS ASSEMBLIES FROM CATIONICALLY AND ANIONICALLY CHARGED FIBERS

Warren Irl Lyness; Robert Andrew Gloss, and Norman Andrew Bates, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 2, 1972, Ser. No. 293,970
Int. Cl.[2] D21F 11/00
U.S. Cl. 162—141 6 Claims

1. A process for the preparation of fibrous assemblies comprising the steps of:

a. forming separate anionically charged and cationically charged slurry aliquots of a single slurry stock, wherein said cationically charged aliquot is prepared from fibers treated at a level of from about 0.1% to about 10.0%, fiber dry weight basis, with a cationic fiber-substantive agent and wherein said anionically charged aliquot is prepared from like fibers treated at a level of from about 0.1% to about 10.0%, fiber dry weight basis, with an anionic fiber-substantive agent;

b. mixing said anionically charged aliquot and said cationically charged aliquot in a mixing zone, simultaneously or immediately thereafter;

c. collecting the resulting discrete fiber aggregates; and

d. draining and drying said aggregates.

3,998,691

NOVEL METHOD OF PRODUCING RADIOACTIVE IODINE

Eiji Shikata, and Hiroshi Amano, both of Tokai, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Continuation of Ser. No. 292,252, Sept. 25, 1972, abandoned. This application July 15, 1974, Ser. No. 488,681
Claims priority, application Japan, Sept. 29, 1971, 46-75414
Int. Cl.[2] G21G 1/06
U.S. Cl. 176—16 4 Claims

1. A process for producing radioactive iodine (I-131) comprising:

heating a compound selected from the group consisting of: telluric acid and tellurium trioxide, at a temperature in the range of about 500° to 560° C to obtain a tellurium oxide intermediate having a composition $TeO_3.nTeO_2$, where n is in the range from about 3.5 to about 4.5,

irradiating said tellurium oxide intermediate with a neutron flux to form I-131 in said intermediate, and

converting the irradiated intermediate to tellurium dioxide by pumping a carrier gas therethrough while heating said irradiated intermediate at a temperature in the range of its decomposition temperature up to about 650° C, thereby releasing said I-131.

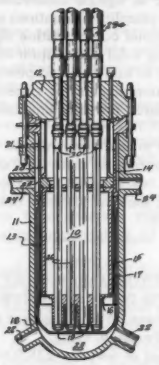
3,998,692

NUCLEAR REACTOR FOR BREEDING U^{233}

Charles S. Bohanan, Raleigh, N.C.; David H. Jones, Pittsburgh, Pa.; Harry F. Raab, Jr., Annandale, Va., and Alvin Radkowsky, Tel Aviv, Israel, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Division of Ser. No. 486,786, July 9, 1974, Pat. No. 3,960,655. This application Dec. 8, 1975, Ser. No. 638,228
Int. Cl.[2] G21G 1/02
U.S. Cl. 176—16 1 Claim

1. Method of producing U^{233} for use in a light-water-cooled breeder reactor comprising operating a seed-and-blanket reactor containing U^{235} fuel and U^{238} fertile material in the seed and Th^{232} fertile material in the blanket, the Th^{232} being physically separated from the uranium, to produce Pu^{239} in the seed and U^{233} in the blanket, recovering the Pu^{239} and U^{233} thus produced, incorporating the Pu^{239} thus produced in the blanket of a seed-and-blanket reactor along with Th^{232} wherein the seed consists of U^{235} and U^{238}, operating the reactor to produce Pu^{239} in the seed and U^{233} in the blanket, continuing such operation of a seed-and-blanket reactor incorporating an optimum proportion of Pu^{239} therein, recovering and retaining



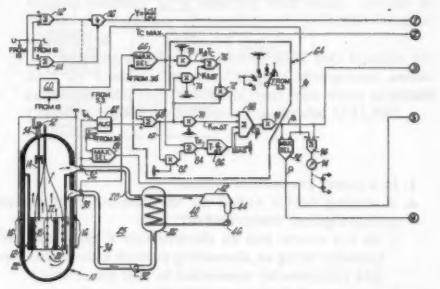
additional amounts of Pu^{239} produced, recovering and retaining U^{233} so produced until enough is obtained to constitute the fissile fuel loading for a U^{233} fueled light-water breeder reactor.

3,998,693

THERMAL MARGIN CONTROL

Charles R. Musick, Rockville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Continuation-in-part of Ser. No. 91,808, Nov. 23, 1970, Pat. No. 3,791,922. This application Jan. 28, 1974, Ser. No. 437,239
Int. Cl.[2] G21C 7/32
U.S. Cl. 176—20 R 37 Claims



1. In a thermal damage protection system for a nuclear steam supply system, said steam supply system including a reactor core having channels therein through which a coolant is circulated, said steam supply system further including sensors for generating signals commensurate with the coolant temperature and means for measuring and providing a signal commensurate with core power as a function of measured neutron flux, the nuclear steam supply system also including means for sensing and generating signals commensurate with neutron flux at a plurality of locations adjacent the core, the improvement comprising:

means responsive to signals commensurate with coolant temperature upstream and downstream of the reactor core for generating a signal commensurate with core power as a function of the thermal energy added to the coolant;

first comparator means responsive to said signal commensurate with core power as a function of added thermal energy and to a signal commensurate with core power as a function of measured neutron flux for selecting the power signal commensurate with the higher power level;

means responsive to the power signal selected by said selecting means for generating a first compensation signal which varies as a function of core radial peaking factor;

means responsive to signals commensurate with neutron flux sensed at a plurality of locations adjacent the core for generating a second compensation signal which varies as a function of the axial distribution of power in the core;

means responsive to said selected power and first and second compensation signals for generating a core power signal compensated for axial and radial peaking factors; and

means responsive to said compensated power signal and to a signal commensurate with the coolant temperature upsteam of the reactor core for generating a signal commensurate with the core thermal limit as a function of a coolant pressure.

3,998,694

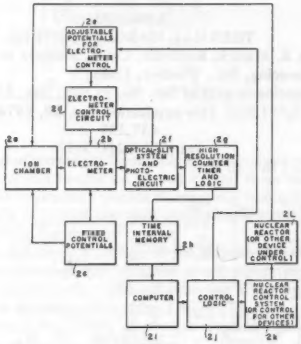
NUCLEAR REACTOR AND PRODUCTION SYSTEMS WITH DIGITAL CONTROLS

Paul P. Luger, Spokane, Wash., assignor to The Pioneer Educational Society, Portland, Oreg.

Continuation-in-part of Ser. No. 238,036, March 27, 1972, abandoned. This application Oct. 9, 1973, Ser. No. 404,180

Int. Cl.[2] G21C 7/08

U.S. Cl. 176—22 3 Claims



1. In a power production system,

a. a sensing device called an ion-chamber-electrometer-optical digitizer comprised of:

1. an ion source and an electrometer means; said electrometer being an alternating current quartz fiber type; said electrometer connected to said ion source;
2. a source of electromagnetic flux;
3. an object illuminated by said source of flux;
4. said object illuminated by said flux being the needle of said electrometer;
5. a focusing means for said flux, a real image of said needle of said electrometer;
6. a mask opaque to said flux, containing an aperture;
7. said mask in focal plane of said focusing means together with said real image so that said aperture and said real image may come into overlapping relationship;
8. a phototransducer positioned adjacent said aperture to receive said electromagnetic flux from said aperture;
9. a transducer signal generated responsive to the presence of said real image of said object at said aperture resulting from the change of flux reaching said transducer;
10. a counter-timer apparatus for measuring and recording time-intervals between said transducer signals; said counter-timer apparatus being a high resolution counter and timer;

b. said power production system being a nuclear reactor;

c. said ion source being a chamber, and said chamber being so positioned as to be responsive to neutron flux level of said neuclear reactor;

d. a control device for said nuclear reactor, comprised of:

1. motorized control rod so positioned that said control rod may be inserted into core of said reactor or may be retracted from the core of said reactor;

e. a linkage between said sensing device and said control device consisting of:

1. an on line computer interfaced to said counter-timer apparatus of said sensing device and also to said motorized control rod;

f. said on line computer effecting control of said control device responsive to said time-intervals from said counter-timer apparatus of said sensing device.

3,998,695

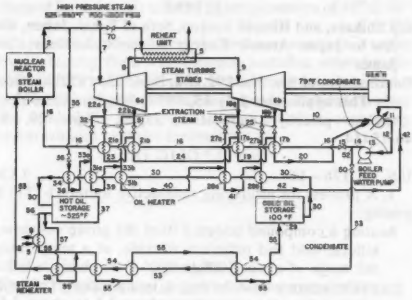
ENERGY STORAGE BY MEANS OF LOW VAPOR PRESSURE ORGANIC HEAT RETENTION MATERIALS KEPT AT ATMOSPHERIC PRESSURE

Robert P. Cahn, 799 Ridgewood Road, Millburn, N.J. 07041, and Edward W. Nicholson, 18 Devon Road, Summit, N.J. 07901

Filed Dec. 16, 1974, Ser. No. 533,263

Int. Cl.[2] G21C 15/16

U.S. Cl. 176—39 8 Claims



1. A process for efficiently utilizing the heat output of a constant output nuclear reactor or fossil fuel furnace and boiler wherein boiler feed water is normally preheated by means of turbine extraction steam, in an electricity generating plant and enabling the plant to achieve flexible power output which comprises the steps of:

a. shunting a portion of extraction steam of various levels of expansion from the turbines to steam-oil heat exchangers during periods of low power demand;

b. shunting a portion of primary high pressure from the boiler to steam-oil heat exchangers during periods of low power demand;

c. moving a fluid low vapor pressure organic heat retention material from a cold storage location to a hot storage location through the heat exchangers of (a) and (b);

d. heating the fluid low vapor pressure organic heat retention material in the heat exchangers of (a) and (b) by means of said extraction steam and primary high pressure steam;

e. storing the hot low vapor pressure organic heat retention material at high temperature at atmospheric pressure in isolation from the atmosphere in a hot storage location;

f. during periods of peak power demand curtailing the boiler feed water preheating being performed by extraction steam;

g. moving the stored hot low vapor pressure organic heat retention material from hot storage to cold storage locations through oil-water heat exchangers;

h. heating boiler feed water in the oil-water heat exchangers of (g) by means of the moving hot low vapor pressure organic heat retention material;

i. passing the heated boiler feed water to the boiler.

3,998,696

METHOD FOR PRODUCING MALTOSE

Chobe Yomoto; Takashi Adachi, both of Kawasaki; Yutaka Nakajima, Machida; Hidemasa Hidaka, Yokohama; Tsukasa Yoshida, and Fumio Sugawara, both of Chiba, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Japan

Filed May 17, 1974, Ser. No. 471,137

Claims priority, application Japan, May 22, 1973, 48-56373

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 R **17 Claims**

1. A process for the production of maltose from a liquified starch having a DE of not more than 10, which comprises saccharifying said liuqified starch at a temperature from about 45° C to about 65° C and at a pH of from about 4.5 to 7.0 with a β-amylase and a new Streptomyces amylase produced by a strain of the species Streptomyces selected from the group consisting of *Streptomyces hygroscopicus, Streptomyces viridochromogenes, Streptomyces aureofaciens, Streptomyces flavus, Streptomyces hygroscopicus vs. angustomyces, Streptomyces albus, Streptomyces tosaensis nov. Sp.* at the same time or separately.

3,998,697

PROCESS FOR PREPARING 2-KETO-L-GULONIC ACID

Takayasu Sonoyama, Sakai; Hiroyoshi Tani, Moriguchi; Bunji Kageyama, Nagaokakyo; Kobee Kobayashi, Nishinomiya; Tahiko Honjo, Minoo, and Shigeo Yagi, Takatsuki, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Apr. 21, 1975, Ser. No. 569,852

Claims priority, application Japan, Sept. 20, 1974, 49-109314

Int. Cl.² C12D *1/06*

U.S. Cl. 195—47 **50 Claims**

1. A method for producing 2-keto-L-gulconic acid or a salt thereof which comprises cultivating a mixed culture of (1) a microorganism strain capable of producing 2,5-diketo-D-gluconic acid from D-glucose which belongs to the genus Acetobacter, Acetomonas or Gluconobacter or an aqueous medium containing viable cells of said microorganism having the enzymatic activity to produce 2,5-diketo-D-gluconic acid from D-glucose, and (2) a microorganism strain capable of converting 2,5-diketo-D-gluconic acid into 2-keto-L-gulonic acid which belongs to the genus Brevibacterium or Corynebacterium or an aqueous medium containing viable cells of said microorganisms having the enzymatic activity to convert 2,5-diketo-D-gluconic acid into 2-keto-L-gluconic acid, in a medium containing D-glucose whereby a mixed culturing is conducted wherein both of said microorganisms or viable cells thereof are present together in the medium during at least part of the entire cultivation in a condition sufficient to produce and accumulate 2-keto-L-gulonic acid or a salt thereof in the resulting culture liquor, and recovering the 2-keto-L-gulonic acid therefrom.

3,998,698

PROCESS FOR PRODUCING ANTIBIOTIC U-51,640

Alexander D. Argoudelis, and Fritz Reusser, both of Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 8, 1976, Ser. No. 674,860

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **8 Claims**

1. A process for preparing antibiotic U-51,640 which comprises:

1. cultivating *Streptomyces ficellus* Dietz, sp. n., having the identifying characteristics of NRRL 8067, and mutants thereof, in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium;
2. filtering a *Streptomyces ficellus* Dietz, sp. n., fermentation beer containing antibiotic U-51,640 to obtain a clear beer;
3. chromatographing said clear beer on a strong-acid cation-exchange resin and eluting said resin with a weak base solution to obtain fractions active against *E. coli* and *P. vulgaris*-sensitive;
4. subjecting said fractions active against *E. coli* and *P. vulgaris*-sensitive to chromatography on a strong-base anion-exchange resin and eluting said resin with water to obtain fractions active against *E. coli* and *P. vulgaris*-sensitive;
5. subjecting said fractions active against *E. coli* and *P. vulgaris*-sensitive to a reaction with sulfur dioxide to obtain a crystalline preparation of U-51,640 bisulfite adduct; and,
6. regenerating antibiotic U-51,640 from said bisulfite adduct by passing the same over a strong-base anion-exchange resin and eluting the resin with water to obtain a relatively pure preparation of antibiotic U-51,640.

5. A process for recovering antibiotic U-51,640 from a fermentation beer containing a mixture of antibiotics U-47,929, U-48,266 and U-51,640, which comprises:

1. filtering a *Streptomyces ficellus* Dietz, sp. n., fermentation beer containing antibiotics U-47,929, U-48,266, and U-51,640 to obtain a clear beer;
2. chromatographing said clear beer on a strong-acid cation-exchange resin and eluting said resin with a weak base solution to obtain fractions active against *E. coli* and *P. vulgaris*-sensitive;
3. subjecting said fractions active against *E. coli* and *P. vulgaris*-sensitive to chromatography on a strong-base anion-exchange resin and eluting said resin with water to obtain fractions active against *E. coli* and *P. vulgaris*-sensitive;
4. subjecting said fractions active against *E. coli* and *P. vulgaris*-sensitive to a reaction with sulfur dioxide to obtain a crystalline preparation of U-51,640 bisulfite adduct; and
5. regenerating antibiotic U-51,640 from said bisulfite adduct by passing the same over a strong-base anion-exchange resin and eluting the resin with water to obtain a relatively pure preparation of antibiotic U-51,640.

3,998,699

ANTIBIOTIC SUBSTANCES B-41, THEIR PRODUCTION AND THEIR USE AS INSECTICIDES AND ACARICIDES

Atsushi Aoki; Rikiya Fukuda; Toshio Nakayabu, all of Sapporo; Keijiro Ishibashi, Tokyo; Chiyoko Takeichi, Tokyo, and Mitsuo Ishida, Tokyo, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Division of Ser. No. 394,073, Sept. 4, 1973, Pat. No. 3,950,360, which is a continuation-in-part of Ser. No. 365,188, May 30, 1973, abandoned. This application May 1, 1975, Ser. No. 573,567

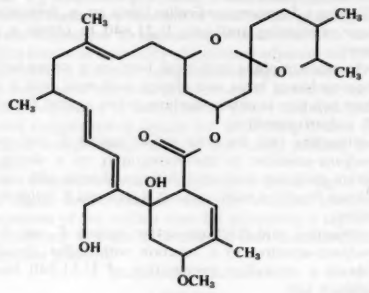
Claims priority, application Japan, June 8, 1972, 47-57058

Int. Cl.² C12D *9/00*

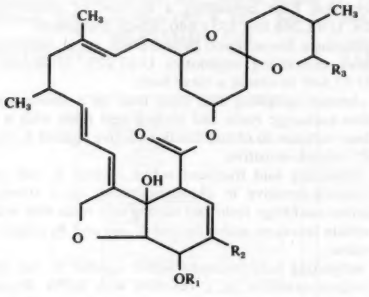
U.S. Cl. 195—80 R **2 Claims**

1. A process for producing antibiotic substances B-41-A_1, B-41-A_2, B-41-A_3, B-41-A_4, B-41-B_1, B-41-B_2, B-41-B_3, B-41-C_1 and B-41-C_2 which comprises culturing Streptomyces strain B-41-146 (NRRL 5739) and mutants thereof, wherein

i. substance A_1 is represented by the formula



ii. substances A_3, A_4, B_2 and B_3 are represented by the formula

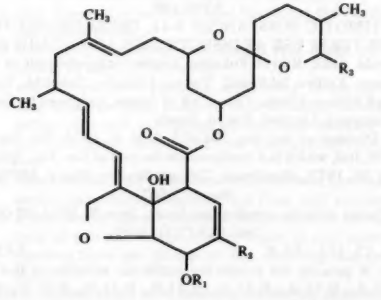


wherein

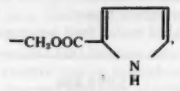
substance	R_1	R_2	R_3
A_2	H	CH_3	CH_3
A_4	H	CH_3	C_2H_5
B_2	CH_3	CH_3	CH_3
B_3	CH_3	CH_3	C_2H_5

wherein R_1 represents a hydrogen atom or methyl, R_2 represents methyl and R_3 represents methyl or ethyl;

iii. substances C_1 and C_2 are represented by the formula



wherein R_1 represents a hydrogen atom, R_2 represents a pyrroyloxymethyl group of the formula



and R_3 represents a methyl group of an ethyl group;

iv. substance B-41-A_2 is a colorless amorphous powder form which is difficultly soluble in water and easily soluble in n-hexane, benzene, acetone, ethanol and chloroform and has a molecular formula of $C_{38}H_{56}O_{10}$, a composition of 71.73% carbon and 8.26% hydrogen and the following properties; molecular weights of 672.1 obtained by an osmometric method in acetone and of 672 according to mass spectrum; a specific rotatory power of $[\alpha]_D^{20} = +54°$ obtained with the concentration of a sample of 5 mg./2ml. and the length of a layer of 10 cm. in acetone; no pKa at a pH ranging from 2 to 12; absorption maximum in the ultraviolet region of the spectrum at 245 mμ; characteristic absorption bands in the infrared region shown in FIG. **11**; nuclear magnetic resonance spectrum in $(CD_3)_2CO$ shown in FIG. **20**; main peaks of the mass spectrum 672, 181, 153 and 151 obtained under the conditions of 75 eV at ionization room temperature of 200° C. and a sample temperature of 120°–190° C.; and the following color reactions according to a thin layer chromatography; yellow to iodine/chloroform, negative to ninhydrin, reddish purple to sulfuric acid and yellow to potassium permanganate; and

v. substance B-41-B_1 is a colorles substance which is difficultly soluble in water and easily soluble in n-hexane, benzene, acetone, ethanol and chloroform and has a molecular formula of $C_{39}H_{58}O_{10}$, a composition of 68.00% carbon and 8.32% hydrogen and the following properties; a melting point of 176°–178° C.; molecular weights of 629.5 obtained by an osmometric method in acetone and of 686 according to mass spectrum; a specific rotatory powder of $[\alpha]_D^{20} = +75°$ obtained with the concentration of a sample of 5 mg./2 ml. and the length of a layer of 10 cm. in acetone; no pKa at a pH ranging from 2 to 12; absorption maximum in the ultraviolet region of the spectrum at 245 mμ; characteristic absorption bands in the infrared region shown in FIG. **14**; nuclear magnetic resonance spectrum in $(CD_3)_2CO$ shown in FIG. **23**; main peaks of the mass spectrum 686, 414, 195, 167, 151 and 125 obtained under the conditions of 75 eV at ionization room temperature of 200° C. and a sample temperature of 120°–190° C.; and the following color reactions according to a thin layer chromatography, yellow to iodine/-chloroform, negative to ninhydrin, reddish purple to sulfuric acid and yellow to potassium permanganate.

3,998,700

CULTURE MEDIUM AND METHOD OF PREPARING BULK STARTERS FOR ITALIAN CHEESE MANUFACTURE

George W. Reinbold, Wheat Ridge, and Malireddy S. Reddy, Thornton, both of Colo., assignors to Leprino Cheese Co., Denver, Colo.

Filed Aug. 27, 1975, Ser. No. 608,094
Int. Cl.² C12K *3/00*
U.S. Cl. 195—96 **18 Claims**

1. A culture medium consisting essentially on a dry weight basis of:

a. 10 to 30% acid-whey solids having a titratable acidity of not less than 0.30%; and

b. 70 to 90% of other solids selected from sweet-whey solids and mixtures thereof with non-fat dry milk (NFDM) solids, said milk solids being present is not over 1 part by weight per each 3 parts of total acid-whey and sweet-whey and solids.

3,998,701

PROCESS FOR THE PREPARATION OF 17-ACYL ESTERS OF 17α, 21-DIHYDROXYSTEROIDS OF THE PREGNANE SERIES AND NOVEL PRODUCTS

Alberto Ercoli, Milan, and Marco Da Col, Bologna, both of Italy, assignors to Lark S.p.A., Milan, Italy

Filed Dec. 3, 1974, Ser. No. 529,134
Claims priority, application Italy, Jan. 4, 1974, 19058/74
Int. Cl.² C12D *13/02*
U.S. Cl. 195—51 S 16 Claims

1. A process for the preparation of 17-monoesters of 17α, 21 dihydroxy steroids comprising:

esterifying the corresponding 17α, 21-dihydroxy steroid 21-phosphate with an acylating agent to directly and solely esterify the 17α-hydroxy group, and

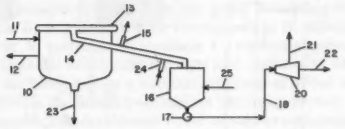
then dephosphorylating the intermediate compound 17-acyloxy-21-phosphate by means of enzymatic hydrolysis carried out with an acid phosphatase at a pH in a range which allows sufficient stability of the desired 17-monoester of 17α,21-dihydroxy steroids, and at temperatures about room temperature.

3,998,702

APPARATUS FOR PROCESSING BITUMINOUS FROTH

Sam Kwame Opoku, Fort McMurray, Canada, assignor to Great Canadian Oil Sands Limited, Canada

Filed Oct. 14, 1975, Ser. No. 622,312
Int. Cl.² B01D *11/00*
U.S. Cl. 196—14.52 11 Claims



3. In a system for extracting bitumen from tar sands by the hot water process, said system including:

a. a primary separation cell for separating the bitumen from the sand wherein the bitumen floats to the upper liquid level in the cell in the form of a froth;

b. overflow launder means adjacent the top of the separation cell for receiving the bitumen froth;

c. means for further separating the bitumen from other impurities in the bitumen froth; and

d. conduit means for providing fluid communication between overflow launder means and the means for further separating the bitumen;

an improvement for deaerating the bitumen froth so that its fluid flow and pumping characteristics are improved, said improvement comprising:

e. means for deflecting the flow of bitumen froth before it flows into the means for further separating the bitumen, so that the length of the flow path of bitumen froth is increased, and the flow directions are intermittently changed; and

f. means, located in conjunction with the deflecting means, for injecting steam into the flow of bitumen froth.

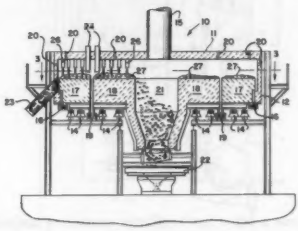
3,998,703

METHOD OF TREATING MATERIALS ON A ROTARY HEARTH

John B. Harrell, Pittsburgh, Pa., assignor to Salem Corporation, Pittsburgh, Pa.

Filed Feb. 6, 1975, Ser. No. 547,628
Int. Cl.² C10B *47/20*, *7/00*
U.S. Cl. 201—32 11 Claims

1. The method for the simultaneous heat treatment of spaced apart and concentrically arranged rows of materials deposited on a horizontally disposed hearth mounted for rotation on a vertical axis and which is confined within a substantially air-tight enclosure wherein one concentrically arranged row of materials is composed of a volatile containing material which will evolve volatiles therefrom when subjected to a heat treatment within the said substantially air-tight enclosure and a separate and spaced apart concentrically arranged row of materials composed of a non-volatile or substantially non-volatile containing material is also deposited on the said rotary hearth, retaining said rows of volatile and non-volatile or substantially non-volatile containing materials in separate and spaced apart rows of materials on said horizontally deposited hearth from the time of deposit of said spaced apart rows of materials on said hearth until the removal thereof from on the said hearth, subjecting said rows of volatile and non-volatile or substantially non-volatile containing materials to a heat treatment within said enclosure by feeding an oxidant into the upper portion of the enclosure to there comingle with the volatiles evolved from the concentrically arranged and spaced apart rows of volatile containing material and to combust therewith in that portion of the enclosure, the heat created by the combustion of the evolved volatiles and oxidant being transferred from the roof and side walls of the enclosure on to the next spaced apart row of non-volatile or substantially non-volatile containing material to thus heat treat the same, and following the heat treatment of said non-volatile or substantially non-volatile containing materials on said hearth, the same as well as the volatile containing materials are removed from said hearth through exit openings in said enclosure.



3,998,704

AUTOMATIC REGULATION SYSTEM FOR A DISTILLATION UNIT

Gerard Follain, and Eugene Bresson, both of Lyon, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, France

Filed Dec. 15, 1971, Ser. No. 208,165
Claims priority, application France, Dec. 16, 1970, 70.45511
Int. Cl.² B01D *3/42*
U.S. Cl. 202—160 11 Claims

1. An automatic regulation system for a distillation unit including: a vessel for containing the product to be distilled,

heating means for heating said vessel,

a distillation column in communication with and surmounting said vessel, recovery tanks,

means for changing the recovery tanks,

a condenser having a lower part communicating with an upper part of said distillation column,

an intermediate tank provided with inlet and outlet valves,

a controlled withdrawing system interposed between said recovery tanks and said condenser, said intermediate tank communicating with said recovery tanks, said intermediate tank further communicating with the lower part of said condenser through said controlled withdrawing system,

pressure reducing means communicating with the assembly formed by the vessel, the distillation column, the con-

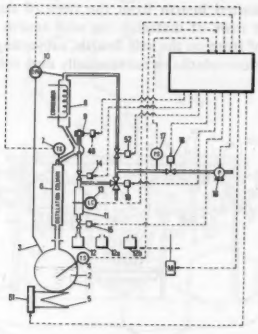
denser and the intermediate tank through valve means for applying a given vacuum or the atmospheric pressure to said assembly,

level control means for controlling the liquid level in said intermediate tank,

first pressure measuring means in said vessel,

second pressure measuring means at the top of said condenser,

first temperature measuring means in said vessel,



second temperature measuring means at the top of said column, controlling means for simultaneously controlling the reflux rate, heating rate, change of fraction and operating pressure of the distillation unit, said controlling means being responsive to said level control means, to said first and second pressure measuring means and to said first and second temperature measuring means for actuating and controlling said controlled withdrawing system, said heating means, said inlet and outlet valves and said pressure reducing means in synchronization with said means for changing the recovery tanks.

3,998,705

DEVICE FOR CONTROLLING THE SEIZURE OF A COVER FOR THE CHARGE OPENING OF A COKING FURNACE

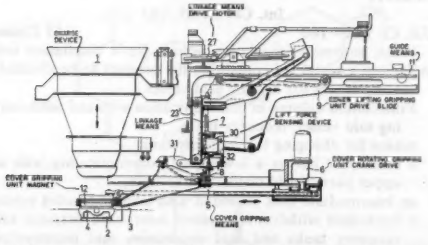
Josef Peters, Bochum-Oberdahlhausen, and Günter Gebhardt, Dortmund, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Oct. 7, 1974, Ser. No. 512,902

Claims priority, application Germany, Oct. 11, 1973, 2351045

Int. Cl.² C10B *31/00*; B66C *17/08*

U.S. Cl. 202—251 **7 Claims**



1. A device for magnetic lifting of the charge opening cover of a coking furnace and removal of said cover from the charging region by means of a gripping unit with magnet, comprising:

a. a crank device connected with said magnet for rotating the charge opening cover back and forth,

b. a linkage means connecting said magnet with a drivable slide having drive means,

c. means connecting said linkage means with the slide drive means in such a way as to cause said drive means to first lift the gripping unit with the charge opening cover and then move said slide, and

d. a force sensing overload safety device connected between said gripping unit and said linkage means and operative to prevent operation of said drive means should the cover become stuck and resist removal of the cover from said charge opening by said gripping unit.

3,998,706

PROCESS FOR THE SEPARATION OF CHLOROHYDROCARBONS FROM LOWER BOILING IMPURITIES

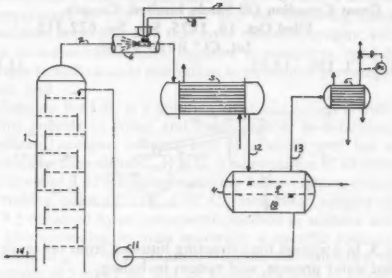
Otto Fruhwirt; Hellmuth Frey, both of Burghausen, and Ludwig Schmidhammer, Haiming, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Aug. 13, 1975, Ser. No. 604,395

Claims priority, application Germany, Sept. 23, 1974, 2445371

Int. Cl.² B01D *3/34*

U.S. Cl. 203—7 **8 Claims**



1. A process for separating lower-boiling chlorohydrocarbons and water from neutralized crude chlorohydrocarbons having from 2 to 4 carbon atoms and from 2 to 4 chlorine atoms, which comprises the steps of

a. fractionally distilling the crude hydrocarbon in a fractionating column thereby obtaining a fraction A containing the desired product and gaseous fraction B comprising water, impurities having a lower boiling point than that of the desired chlorohydrocarbon, and entrained amounts of said desired chlorohydrocarbon;

b. removing the gaseous fraction from the top of the column;

c. mixing the fraction while still in gaseous form with water vapor, an aqueous solution of a basic alkali metal compound containing from 0.05 to 25% by weight of the alkali metal compound and an aqueous solution of ammonia and an aliphatic amine up to 4 C atoms, containing a total of from 0.05 to 5% by weight of ammonia and amine;

d. cooling said gaseous fraction by condensation to such a temperature that only water and a major portion of the chlorohydrocarbon from fraction B condenses into a liquid phase, while a major portion of the lower-boiling impurities remains in the gaseous phase;

e. separating the said gaseous phase from said liquid phase and condensing it;

f. separating said liquid phase into an aqueous phase and an organic phase;

g. conveying the organic phase back into the fractionating column; and

h. removing purified chlorohydrocarbon from the lower part of the column.

3,998,707

CADMIUM ELECTROPLATING PROCESS AND BATH THEREFOR

Jaan-Jiue Fong, Tolland, Conn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 14, 1975, Ser. No. 595,347
Int. Cl.² C25D 3/26
U.S. Cl. 204—50 R 13 Claims

1. An aqueous electroplating bath for depositing cadmium comprising about 5 to about 75 grams per liter of cadmium ion, a free acid selected from the group consisting of sulfuric acid, fluoboric acid or mixtures thereof, the concentration of said free acid being from about 0.4N to about 4.0N, and a surfactant combination comprising about 0.5 to about 20.0 grams per liter of a cationic polyoxyalkylated amine and from about 0.5 to about 10.0 grams per liter of an anionic surfactant.

3,998,708

ELECTROCHEMICAL PROCESS FOR PREPARING HYDROXYLAMINOEVERNINOMICINS

Peter Kabasakalian, Bloomfield; Sami Y. Kalliney, Parsippany; Ashit K. Ganguly, Upper Montclair, and Anita Westcott, Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jan. 19, 1976, Ser. No. 650,082
Int. Cl.² C25B 3/04; C07D 325/00; C07H 15/00
U.S. Cl. 204—59 R 16 Claims

1. The process which comprises electrochemically reducing an everninomicin selected from the group consisting of everninomicin B, everninomicin C, everninomicin D, nitrosoeverninomicin B, nitrosoeverninomicin C, nitrosoeverninomicin D, and phenolic mono-cationic salts and amine acid addition salts of the foregoing, at a cathode potential of about at least as negative as the lowest potential on the rising portion of the polarographic current-voltage curve of said everninomicin, in a medium selected from the group consisting of an anhydrous aprotic solvent in the presence of carbon dioxide, an aqueous medium comprising water and a miscible organic solvent buffered to a pH in the range of from about 6 to about 13 under an inert atmosphere and, when said everninomicin is a nitrosoeverninomicin, an aprotic solvent under an inert atmosphere, and having an electrolyte comprising a difficultly reducible cation selected from the group consisting of alkali metal and alkyl substituted ammonium ions, whereby is produced the corresponding hydroxylaminoeverninomicin selected from the group consisting of hydroxylaminoeverninomicin B, hydroxylaminoeverninomicin C, and hydroxylaminoeverninomicin D.

3,998,709

TREATING REMAINS CONTAINING SODIUM CHLORIDE AND SODIUM SULPHATE

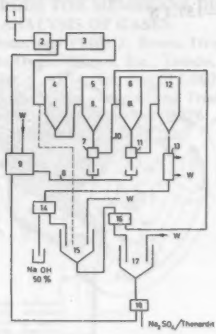
Robert Winkler, Wallisellen, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Sept. 19, 1975, Ser. No. 615,187
Claims priority, application Switzerland, Sept. 26, 1974, 13029/74
Int. Cl.² C25B 1/16, 1/26; B01D 1/00
U.S. Cl. 204—98 15 Claims

1. In a process for treating sodium chloride brine containing sodium sulphate wherein the brine is subjected to diaphragm electrolysis to produce caustic cell solution, said caustic cell solution is then subjected to evaporation and cooling stages to increase the concentration of sodium hydroxide and crystallize sodium chloride and sodium sulphate, and the caustic solution of higher concentration is then separated from the crystallized salts to leave a residual product comprising a mixture of crystallized sodium chloride and sodium sulphate with a residue of the sodium hydroxide solution, the improvement which comprises

a. removing from the residual product the sodium hydroxide solution to thereby provide a preliminary mixture of sodium chloride and sodium sulphate;

b. slurrying said preliminary mixture with water to produce a mother brine saturated with respect to both sodium chloride and sodium sulphate, the slurrying conditions being such that at least a major portion of the sodium chloride and a first part of the sodium sulphate in said



preliminary mixture are dissolved while a second part of the sodium sulphate and any remaining sodium chloride remain as suspended solids;

c. separating the suspended solids from said mother brine; and

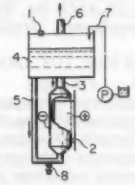
d. feeding back to a process stage preceding cooling at least some of said mother brine from which the suspended solids have been separated.

3,998,710

PROCESS FOR ELECTROLYTICALLY PURIFYING A PHOTOGRAPHIC WASTE SOLUTION

Reiichi Itai, and Katsuyuki Murakami, both of Maebashi, Japan, assignors to The Japan Carlit Co., Ltd., Tokyo, Japan

Filed Mar. 8, 1976, Ser. No. 665,057
Claims priority, application Japan, Mar. 11, 1975, 50-29318
Int. Cl.² C02B 1/82
U.S. Cl. 204—130 4 Claims

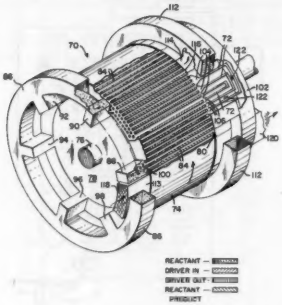


1. In a process for electrolytically purifying a photographic waste solution containing a developer and a fixing waste solution, after silver has been recovered from said waste solution, the improvement which comprises adding to said waste solution about 5 to about 60 grams of chloride ion and about 5 to about 30 grams of carbonate ion per liter of said waste solution, and subjecting the resulting waste solution to non-diaphragm electrolytic oxidation at a pH of 4 to 10, a temperature of 10° to 100° C, an anode current density of 2 to 40 amperes per square decimeter and a current concentration of 3 to 50 amperes per liter.

3,998,711
METHOD FOR CONTINUOUSLY CARRYING OUT A GAS PHASE REACTION AND APPARATUS THEREFOR

Abraham Hertzberg, and Walter Christiansen, both of Bellevue, Wash., assignors to Mathematical Sciences Northwest, Inc., Bellevue, Wash.

Filed Nov. 28, 1975, Ser. No. 635,930
Int. Cl.² B01J 1/12; C01B 21/16
U.S. Cl. 204—157.1 S 27 Claims



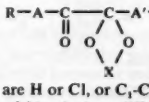
1. A method of rapidly heating and cooling a reactant gas in a wave reactor including the steps of:
introducing a preheated reactant gas into the upstream end of a first tube means in said wave reactor;
introducing a heater driver gas into the downstream end of said first tube means at a first pressure to compress and heat said reactant gas;
exhausting said driver gas from the downstream end of said first tube means at a second pressure higher than said first pressure while expanding and cooling said reactant gas;
circulating said exhausted driver gas into the downstream end of a second tube means such that said gas enters said second tube means at said first pressure; and
exhausting said reactant gas from the downstream end of said tube means.

3,998,712
MONOKETAL OF DIKETONES AS SENSITIZER FOR U.V. POLYMERIZABLE SYSTEMS

Eckhard Hickmann, Ludwigshafen; Martin Fischer, Ellerstadt; Milan Velic, and Otto Volkert, both of Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 29, 1973, Ser. No. 375,075
Claims priority, application Germany, July 1, 1972, 2232365
Int. Cl.² C08F 8/00, 2/48; G03C 1/68, 5/08
U.S. Cl. 204—159.15 7 Claims

1. Compositions capable of being cured by ultraviolet irradiation comprising compounds having at least one carbon-carbon multiple bond polymerizable under the action of ultraviolet irradiation, or mixtures of such compounds, and as a photoinitiator, a monoketal of a diketone of the formula



wherein R and R′ are H or Cl, or C_1-C_4-alkyl, C_1-C_4-alkoxy or C_1-C_4-alkoxyalkyl of identical or different type, X is C_nH_{2n} with n being 2 to 8 and A and A′ are six-membered aromatic radicals of identical or different type in a sufficient amount of said photoinitiator to initiate and accelerate the polymerization of said carbon-carbon multiple bonds upon exposure to ultraviolet irradiation, said amount being 0.01 to 10% by weight relative to said photosensitive compositions.

3,998,713
PROCESS FOR CONTROLLED RADIATION POLYMERIZATION AND COPOLYMERIZATION OF MONOOLEFINIC AND DIOLEFINIC MONOMERS USING METALLIC CATALYSTS

Miroslav Marek, and Ludek Toman, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

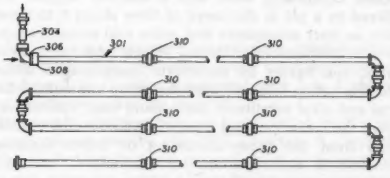
Filed Aug. 5, 1971, Ser. No. 169,506
Claims priority, application Czechoslovakia, Aug. 14, 1970, 5648-70
Int. Cl.² C08F 2/46, 4/00
U.S. Cl. 204—159.24 6 Claims

1. A process for the controlled polymerization and copolymerization of monoolefinic and diolefinic monomers which are polymerizable by a cationic mechanism comprising initiating the polymerization reaction with a system comprising at least one halide selected from the group consisting of tetravalent vanadium, titanium and zirconium halides in the presence of at least one activating agent selected from the group consisting of alkali metals, alkaline earth metals, amalgams thereof, and the hydrogen compounds of the metals of Groups I, II, III and IV of the Periodic Table for said halide and accelerating and controlling the reaction by irradiation.

3,998,714
SYSTEM FOR POLLUTION SUPPRESSION

Edward T. Armstrong, Butler, N.J., assignor to TII Corporation, Lindenhurst, N.Y.

Continuation-in-part of Ser. No. 355,738, April 30, 1973, Pat. No. 3,853,764, which is a continuation-in-part of Ser. No. 100,333, Dec. 21, 1970, Pat. No. 3,730,881, which is a continuation-in-part of Ser. No. 813,382, Feb. 28, 1969, Pat. No. 3,549,528, which is a continuation-in-part of Ser. No. 362,118, April 23, 1964, abandoned. This application Dec. 9, 1974, Ser. No. 531,095
Int. Cl.² C02B 3/08
U.S. Cl. 210—62 9 Claims



1. A two stage oxidative process for disinfection of material containing a distribution of ammonia-ammonium compounds, comprising,
adding a primary oxidizing agent to the material to disinfect and to reduce the pH level of said material,
said primary oxidizing agent selected from the class consisting of ferric chloride and aluminum chloride,
adding a secondary oxidizing agent to the material to obtain a very low bacteria count and a substantial amount of ammonium compounds,
said secondary oxidizing agent selected from the class consisting of chlorine, chlorine dioxide, ozone and sodium hypochloride,
the amount of said primary oxidizing agent added is sufficient to cause said pH of said material to be 7.0 or less,
said amount of primary oxidizing agent being at least 50 parts per million,
the amount of said secondary oxidizing agent being at least 0.7 parts per million for ozone and at least 4.0 parts per million for said chlorine, chlorine dioxide and sodium hypochloride,
said material being selected from the class consisting of sewage effluent, potable water and process water,

the amount of said ammonium compounds to said ammonia compounds produced being at least 97 percent,

said primary oxidizing agent being added to a first stage and, said secondary oxidizing agent being added to a second stage,

said second stage having a conduit located therein, said conduit containing a turbulence-causing device,

said turbulence-causing device being a flat plate orifice, an injection tube having a tip extending through said flat plate orifice,

said tip of said injection tube being located in the vena contracta portion of said flat plate orifice, and said secondary oxidizing agent being injected into said conduit through said injection tube.

3,998,715
RADIATION CROSSLINKED POLYVINYL CHLORIDE AND PROCESS THEREFOR

Georg G. A. Böhm, Akron, Ohio; Dale S. Pearson, Hauppauge, and James O. Tveekrem, E. Patchogue, both of N.Y., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

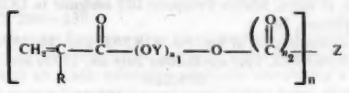
Filed June 6, 1974, Ser. No. 476,776

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C08F *8/00*; **C08L** *91/00, 27/22*

U.S. Cl. 204—159.16 **12 Claims**

1. Polyvinyl chloride compositions curable by high energy ionizing radiation comprising polyvinyl chloride having an average molecular weight of from about 50,000 to 150,000, together with from about 2% to 50% of at least one curing agent having the general formula:



wherein:

R is hydrogen or methyl

n is 1 to 4

n_1 is 0 or 1

n_2 is 0 or 1

Y is a bifunctional, aliphatic organic radical which may be linear or branched and may be substituted with an acrylic or methacrylic radical or with a radiation stable group, and

Z is an alicyclic group, an aryl group, or an aralkyl group which contains up to two carbon atoms in an exocyclic chain, said groups containing up to two alicyclic rings which may be fused, joined directly through a carbon atom on each ring or bridged together through a carbon or oxygen atom; with the proviso that n_1 and n_2 are not both zero in the same compound; if n_2 is one, n_1 is one; and if n is one Y must contain an acrylic or methacrylic function.

3,998,716
METHOD OF APPLYING COATINGS

Edward J. Masar, Sylvania; John B. Boucher, Bowling Green, and Ralph A. Williams, Swanton, all of Ohio, assignors to Inmont Corporation, New York, N.Y.

Filed June 3, 1974, Ser. No. 475,854

Int. Cl.² C25D *13/04, 13/06, 13/20*

U.S. Cl. 204—181 **10 Claims**

1. A method of applying protective and decorative finishes to metal surfaces comprising

a. electrodepositing a primer coat on the phosphate treated metal surface,

b. rinsing the primer coated surface with water,

c. drying the rinsed primer coat for about 5 minutes at 200° F. to evaporate residual surface water without curing the primer film,

d. electrostatically spraying powder paint onto the uncured primer coating to form a topcoat thereon and

e. baking the coated surface at 325° F. for 20–30 minutes to cure the uncured primer coat and the uncured powder paint.

3,998,717
GLASS ELECTRODE FOR MEMBRANE DIFFUSION ANALYSIS OF GASES

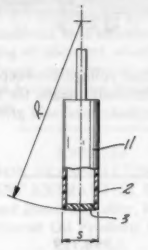
Barry Watson, Toledo, and Philip J. Breno, Oregon, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 1, 1974, Ser. No. 511,002

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² G01N *27/46, 27/36*

U.S. Cl. 204—195 P **2 Claims**



1. In an electrochemical cell for potentiometrically analyzing gaseous specimens wherein said gaseous specimen permeates a thin, flexible, semipermeable membrane of microporous polyproplyene and dissolves in an electrolyte to cause a measurable change in pH of said electrolyte, said cell comprising a glass electrode having a pH sensitive sensor tip, a reference electrode, a reservoir of liquid electrolyte, said sensor tip and said reference electrode being in electrical communication with each other through said reservoir of electrolyte, and said membrane being spaced from but positioned adjacent said sensor tip to confine a thin liquid film of said electrolyte without a spacer between said sensor tip and said membrane; the improvement wherein the outer surface of said sensor tip has a convex curvature defined by a radius of curvature of between about 1 inch and about 2.5 inches, said sensor tip being attached to a chemically resistant glass tube having a diameter of about ⅛ inch at the point of attachment to define the height of the arc of said tip in the range of about 5 to about 15 mils whereby the thin film of liquid electrolyte confined between the sensor tip and the membrane is essentially of uniform thickness across the surface of said sensor tip.

3,998,718
ION MILLING APPARATUS

Christopher Mark Melliar-Smith, Morris, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

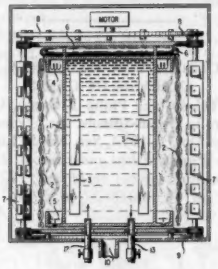
Filed Feb. 18, 1976, Ser. No. 659,042

Int. Cl.² C23C *15/00*

U.S. Cl. 204—298 **5 Claims**

1. An apparatus for patterning thin films by ion bombardment comprising: (1) an ion source comprising a metal cylinder, a heated cathode placed around the circumference of one extremity of said cylinder, an anode placed around the circumference of the other extremity of said cylinder and facing said cathode, an accelerating grid placed concentrically around said cylinder and enclosing said anode and said cathode, and means for injecting a gas between said cylinder and said grid; (2) a plurality of elongated, multifaceted substrate holders placed outside of said grid, and each mounted on an axis for rotation with the axes essentially parallel to the axis of said cylinder; (3) means for causing said substrate holders to

rotate, and means for causing the holders to revolve with respect to said ion source; (4) a vacuum chamber enclosing said ion source and said substrate holders; (5) electrode



means for applying a first voltage between said cathode and said anode; and (6) electrode means for applying a second voltage between said cylinder and said grid.

3,998,719

ISOTACHOPHORETIC COLUMNS

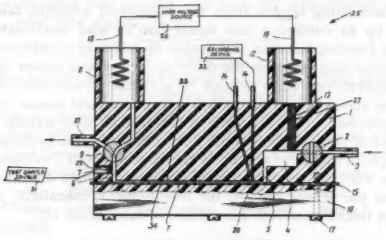
Mirko Deml; Petr Bocek, and Jaroslav Janak, all of Brno, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Aug. 21, 1975, Ser. No. 606,574

Claims priority, application Czechoslovakia, Aug. 21, 1974, 5797-74

Int. Cl.² G01N *27/28, 27/00*

U.S. Cl. 204—299 6 Claims



1. In an isotachophoretic column for separating ions in a test sample to be analyzed, comprising first and second spaced, electrolyte-receiving chambers each having an electrode associated therewith, an elongated capillary, first means for selectively interconnecting the first electrode chamber to one end of the capillary, second means for selectively interconnecting the second electrode chamber to the other end of the capillary, means for injecting a test sample to be analyzed into the capillary, means for applying a voltage across the electrodes of the first and second electrode chambers to establish a flow of ions of the test sample through the capillary, and means for detecting the ionic components in such flow, the improvement wherein the column includes a first unitary insulating body, in which the first and second electrode chambers and the first and second interconnecting means are defined by spaced portions of the first body, and wherein the capillary has first and second planar, parallel boundary walls, the first boundary wall of the capillary being defined by a first region of the first body.

3,998,720

APPARATUS FOR PREPARING INSULATION WIRE BY ELECTRODEPOSITION

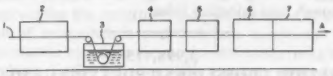
Kyoichi Shibayama; Fumihiko Sato, and Yoshizumi Fujii, all of Minamishimizu-Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1975, Ser. No. 626,779

Claims priority, application Japan, Oct. 29, 1974, 49-125065

Int. Cl.² C25D *13/04, 13/24*

U.S. Cl. 204—300 EC 4 Claims



1. In an apparatus for preparing an insulation wire by an electrodeposition coating method which comprises:

means for forming a resin layer on the surface of a conductive material by an electrodeposition coating method;

means for applying a coagulant to the resin layer; and

means for heating to cure it,

the improvement which comprises means for recovering the coagulant vapor generated in the part for applying the coagulant and the part for heating to cure it.

3,998,721

HYDROCARBONACEOUS BLACK OIL CONVERSION PROCESS

Mark J. O'Hara, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 428,562, Dec. 26, 1973, Pat. No. 3,909,453. This application July 28, 1975, Ser. No. 599,520

Int. Cl.² C10G *13/02;* B01J *23/16*

U.S. Cl. 208—111 7 Claims

1. A process for the conversion of an asphaltene-containing hydrocarbonaceous charge stock which comprises reacting said charge stock and hyrdrogen in contact with a catalytic composite comprising a Group VIII metal and a Group VIB metal impregnated on a refractory inorganic oxide carrier material wherein said composite is prepared in a manner which comprises:

a. initially impregnating the refractory inorganic oxide carrier with an aqueous solution of a Group VIII metal compound;

b. drying the impregnated carrier material to contain less than about 50 wt. % volatile matter as determined by weight loss on ignition at 500° C.;

c. further impregnating the Group VIII metal compound-containing carrier material with molybdic acid dissolved in aqueous ammonium hydroxide; and

d. drying the resulting composite and calcining the same in an oxidizing atmosphere at a temperature of from about 500° to about 700° C.

3,998,722

HIGH TEMPERATURE HYDROCONVERSION WITHOUT INCOMPATIBLES FORMATION

Francis X. Mayer, 5277 Whitehaven, Baton Rouge, La. 70808; James H. Taylor, Jr., 5545 Melrose Blvd., Baton Rouge, La. 70806; David E. Mueller, 14543 Breton Blvd., Baton Rouge, La. 70816, and Willard H. Sawyer, 425 Oak Hills Parkway, Baton, La. 70810

Filed Dec. 31, 1975, Ser. No. 645,640

Int. Cl.² C10G *13/02;* B01J *27/04*

U.S. Cl. 208—112 11 Claims

1. In a process for the demetallization and conversion of the 1050° F.+ materials of a heavy metals containing hydrocarbon feed to 1050° F.− material by

contacting said feed, in the presence of added hydrogen, with a catalyst characterized as comprising a composite of from about 5 to about 30 percent of a Group VIB metal, or compound thereof, from about 1 to about 12 percent of a Group VIII metal, or compound thereof, or admixture of said Group VIB and Group VIII metals, or compounds thereof, and a porous inorganc oxide support, at severity sufficient to convert at least about 30 percent of the 1050° F.+ material to 1050° F.− material, while removing at least about 80 percent of the heavy metals from the feed,

the improvement comprising

initiating the reaction at a preselected temperature within a range of from about 775° F. to about 825° F. sufficient to convert the 1050° F.+ materials, but insufficient to form a significant amount of incompatible materials, and continuing the conversion throughout the operating period to end-of-run at essentially the same temperature.

3,998,723
HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application May 27, 1975, Ser. No. 581,249

Int. Cl.² B01J *11/08;* **C10G** *35/08*

U.S. Cl. 208—139 **16 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 2 wt. % rhenium, about 1.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen, wherein the platinum or palladium, rhodium, rhenium, and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium rhodium and rhenium are present in the corresponding elemental metallic states and wherein substantially all of the tin is present in an oxidation state above that of the elemental metal and in a particle size which is less than 100 Angstroms in maximum dimension.

3,998,724
HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 12, 1975, Ser. No. 576,924

Int. Cl.² C01G *35/08;* **B01J** *11/08;* **C10G** *13/02;* **C07C** *5/28*

U.S. Cl. 208—139 **20 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt or nickel, about 0.1 to about 5 wt. % iron, and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, catalytically available cobalt or nickel, and iron are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the iron is present in an oxidation state above that of the elemental metal, and wherein substantially all of the catalytically available cobalt or nickel is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

3,998,725
METHOD OF REMOVING ALKYL LEAD COMPOUNDS FROM LIQUID HYDROCARBON FUELS

Abraham A. Zimmerman, New Providence, and George S. Musser, Warren, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Apr. 30, 1975, Ser. No. 573,121

Int. Cl.² C10G *17/00*

U.S. Cl. 208—253 **14 Claims**

1. A method for separating an organolead compound from liquid hydrocarbons comprising the steps of: contacting a liquid hydrocarbon containing an organolead compound dissolved therein with a contact material, said contact material comprising between about 5 and about 20 wt. % $CuCl_2$, between about 3 and 155 wt. % water and between about 65 and about 92 wt. % adsorbent, said adsorbent being selected from the group consisting of silica gel, alumina and silica-alumina, and said $CuCl_2$ being impregnated on said adsorbent and recovering a liquid hydrocarbon having a reduced dissolved lead content therein.

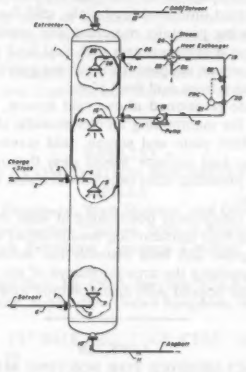
3,998,726
HYDROCARBON DEASPHALTING PROCESS AND SOLVENT EXTRACTOR THEREFOR

Bennie I. Bunas, and James S. Kellar, both of Des Plaines, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 25, 1975, Ser. No. 590,186

Int. Cl.² C10G *21/14*

U.S. Cl. 208—309 **9 Claims**



1. A process for deasphalting an asphalt-containing hydrocarbonaceous charge stock which comprises the steps of:

a. countercurrently contacting said charge stock with a hydrocarbon-selective solvent, in a solvent extraction zone, at extraction conditions selected to produce a solvent-lean asphaltic stream and a solvent-rich hydrocarbon stream;

b. withdrawing said asphaltic stream from said extraction zone at a lower first locus thereof, and a solvent-rich desphalted oil stream from an upper second locus thereof;

c. removing another solvent-rich hydrocarbon stream from said extraction zone through a third locus intermediate said first and second loci, and heating the same sufficiently to increase the temperature thereof by about 25° F to about 125° F; and,

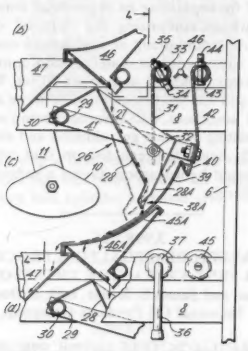
d. introducing the heated portion of said solvent-rich hydrocarbon stream into said extraction zone through a fourth locus intermediate said second and third loci.

3,998,727

ELECTROSTATIC SEPARATOR

Philip John Giffard, PS1956 Nerang Road, Southport, Queensland, Australia

Filed Aug. 2, 1974, Ser. No. 494,290
Int. Cl.² B03C 7/10
U.S. Cl. 209—127 R 5 Claims



1. An electrostatic separator unit comprising:
an arcuate feed plate;
a feed introduction means adapted for feeding a mixture to be separated onto said feed plate, said feed introduction means being pivotally mounted and rotationally adjustable about a common axis with said feed plate;
an arcuate screen adapted for receiving gravitational flow of the mixture from said feed plate;
an electrode positioned above said screen, said electrode adapted for maintaining an electrostatic charge opposite to said feed plate and screen, said screen dimensioned such that said mixture would pass through said screen absent a potential difference between said screen and said electrode;
means for rotationally positioning at least one of said feed plate and feed introduction means about a common axis of said plate and feed introduction means wherein the arcs comprising the arcuate shapes of the feed plate and screen are coaxial with said common axis.

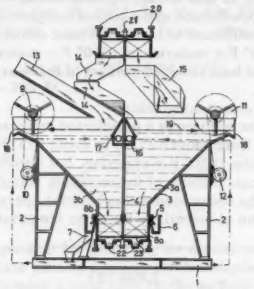
3,998,728

SETTLING CLASSIFIER FOR SORTING MINERAL RAW MATERIALS

Werner Strauss, Bochum, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Mar. 3, 1975, Ser. No. 555,042
Claims priority, application Germany, Mar. 2, 1974, 2410112
Int. Cl.² B03B 5/42
U.S. Cl. 209—172.5 3 Claims

1. Settling classifier for sorting mineral raw materials into at least three components comprising container means wherein at least two separating baths of different density are received, said container means having a partition therein separating said baths one from another, a bucket wheel coordinated with said container means so as to be in communication with said separating baths and being rotatable in a plane extending parallel to said partition, said bucket wheel having a dividing ring therein operatively engaging said partition and dividing said bucket wheel into parts corresponding to the respective baths, said separating baths having respective elongated quadrilateral surfaces, the longitudinal direction of which extends in axial direction of the rotary bucket wheel, means located at said partition for supplying material to be separated to said



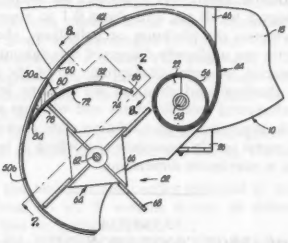
container means, and means located at a side of said separated baths distant from said partition, for discharging at least one component of the material from said baths and means for supplying bath media to said baths located in vicinity of said material supplying means at said partition.

3,998,729

ROCK SCREEN FOR SPREADER-LOADER

Thomas A. Bedwell, and Bruce L. Call, both of Drawer G, Logan, Utah 84321

Continuation-in-part of Ser. No. 426,632, Dec. 12, 1973, Pat. No. 3,899,066. This application May 2, 1975, Ser. No. 573,893
Int. Cl.² B07B 1/06
U.S. Cl. 209—240 4 Claims



1. In a loader for liquid manure products:
a housing having an intake opening, a discharge opening, and an arcuate flow passage for said products communicating said openings with one another for product flow through the housing along an arcuate path of travel;
an arcuate perforated member across said intake opening and spaced inwardly from the latter within said passage,
said discharge opening being spaced from said intake opening downstream from said member flow; and
a rotary sucking impeller mounted within said space in substantially concentric relationship with the member for drawing products into the passage on one side of the impeller, screening foreign objects from the products along the member, and propelling such foreign objects back out the intake opening on the opposite side of the impeller,
said housing having a passage-defining wall,
said member merging with said wall on said one side of the impeller and terminating in a free end spaced from said wall on said opposite side of the impeller.

3,998,730
METHOD OF PURIFYING WASTE WATER

Theodor Ploetz, deceased, Late of Ratingen, Germany (by Adelbert Hasse, administrator); Ursula Haupt, and Edeltraud Solich, both of Viersen, all of Germany, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Duesseldorf-Oberkassel, Germany

Filed Oct. 16, 1975, Ser. No. 622,957

Claims priority, application Germany, Oct. 19, 1974, 2449500

Int. Cl.² B01D *15/00*

U.S. Cl. 210—28 **6 Claims**

1. A method of purifying waste water contaminated by at least one member of the group consisting of lignin and the products of sulfonation, chlorination, and oxidation of lignin, which comprises:

a. dissolving in said waste water at a pH value not greater than 7 an aluminum salt as a source of aluminum ions;

b. thereafter contacting the aqueous solution so produced with granular γ-alumina until said at least one member is adsorbed by said alumina as a water-insoluble precipitate; and

c. separating the water thereby purified from the alumina carrying said precipitate, the amount of said aluminum ions being sufficient to repress dissolution of said γ-alumina in said aqueous solution.

3,998,731
METHOD OF PURIFYING THE WASTE WATER OF PAPER MILLS

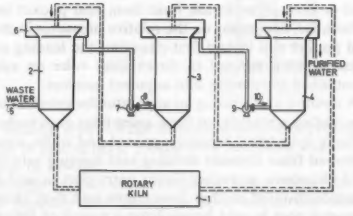
Volker Franzen, Heidelberg; Theodor Ploetz, Ratingen; Ursula Haupt, and Edeltraud Solich, both of Viersen, all of Germany, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Duesseldorf-Oberkassel, Germany

Filed Apr. 10, 1975, Ser. No. 566,939

Claims priority, application Germany, Apr. 13, 1974, 2418169

Int. Cl.² B01D *15/06*

U.S. Cl. 210—32 **8 Claims**



1. A method of purifying waste water of oxygen-demanding, organic contaminants including lignin, said waste water being an effluent from a paper or cellulose mill, which method comprises:

a. contacting granular, activated γ-alumina with said waste water at pH 2.2 to 3.0 until said contaminants are adsorbed on said alumina; and

b. separating the waste water thereby purified from the alumina having said contaminants adsorbed thereon.

3,998,732
METHOD FOR PURIFYING WATER OF ORGANIC COMPOUNDS NOT READILY BIODEGRADABLE

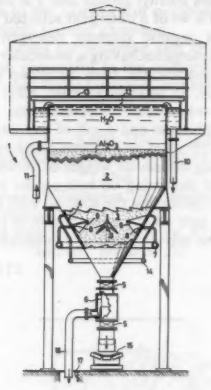
Hermann Solbach, Ravensburg, Weissenau, and Hans Foerster, Essen, both of Germany, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Duesseldorf-Oberkassel, Germany

Filed Oct. 16, 1975, Ser. No. 623,209

Claims priority, application Germany, Oct. 19, 1974, 2449756

Int. Cl.² B01D *15/06*

U.S. Cl. 210—32 **9 Claims**



1. A method of purifying contaminated waste water, from paper and pulp mills of organic impurities substantially not biodegradable which comprises contacting said waste water with granular, porous γ-alumina until said impurities are adsorbed on said alumina, said alumina having a particle size of 0.5 to 10 mm and a specific surface area of at least 140 m_3/g.

3,998,733
DETERGENT COMPOSITION FOR DISPERSING OIL SPILLS

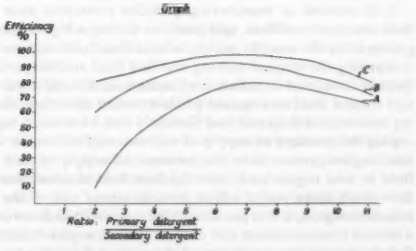
Peter Michael Blanchard, West Molesey, and Dudley Grahame Meeks, Kingston-upon-Thames, both of England, assignors to The British Petroleum Company Limited, London, England

Filed Nov. 13, 1974, Ser. No. 523,525

Claims priority, application United Kingdom, Nov. 21, 1973, 53923/73

Int. Cl.² B01F *3/08, 17/02;* **C11D** *1/83*

U.S. Cl. 210—59 **11 Claims**



1. An oil and water miscible composition suitable for dispersing oil spilt on water or beaches consisting essentially of

i. from 25 to 50% wt of an ester of a polyoxyethylene glycol and a C_{10} –C_{24} fatty acid, the ester having the general formula:

$$R{-}C(=O){-}O(C_2H_4O)_xH$$

where R is selected from the group consisting of C_9 –C_{22} alkyl and C_9 –C_{23} groups alkenyl groups and x is from 2 to 7,

ii. from 5 to 45% wt of a detergent selected from the group consisting of organic sulphate detergents and organic sulphonate detergents having a molecular weight of from 200 to 500 and selected from the group consisting of an alkyl sulphate, an alkyl sulphonate, alkyl ether sulphate, alkyl ether sulphonate, alkyl aromatic sulphate, alkyl aromatic sulphonate and a salt of any one thereof, and

iii. from 5 to 65% wt of an alkylene oxide condensate of an alkanol having molecular weight of 90 to 250.

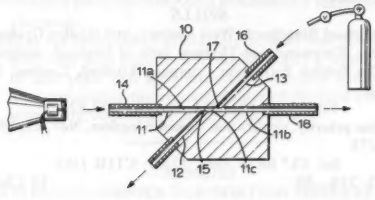
9. A method of dispersing oil spilt on the surface of water which comprises contacting the spilt oil with from 5 to 100% by volume of the spilt oil of a composition as claimed in claim 1 and agitating the mixture formed to disperse the oil.

3,998,734

METHOD AND APPARATUS FOR TRANSFERRING PARTICLES FROM ONE FLUID STREAM INTO ANOTHER

Anthony Rene Barringer, Willowdale, Canada, assignor to Barringer Research Limited, Rexdale, Canada

Filed Jan. 8, 1973, Ser. No. 321,852
Claims priority, application Canada, Jan. 12, 1972, 132220
Int. Cl.² B01D *45/04; G01N 31/00*
U.S. Cl. 210—65 **1 Claim**



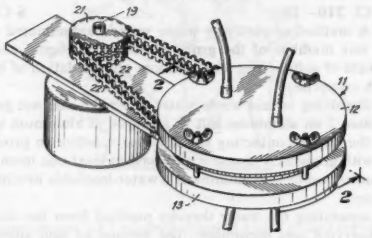
1. A method of transferring particles contained in a first fluid into a second fluid, said particles having a higher specific gravity than the specific gravity of said first fluid, said method comprising the steps of moving said first fluid and the particles therein contained in a first predetermined direction, moving said second fluid in a second predetermined direction, directing said second fluid and said first fluid into a common region, setting the pressure of supply of said second fluid to the common region greater than the pressure of supply of said first fluid to said region such that the first fluid is constrained to flow at all times out of a first predetermined exit of the said common region, a first portion of the second fluid flows out of a second predetermined exit of the common region free of the first fluid, and the remainder of the second fluid flows out of the said first predetermined exit, and such that the said particles in said first fluid are transferred across said region to said first portion of the second fluid by virtue of their momentum.

3,998,735

APPARATUS AND METHOD FOR SEPARATING A MOTHER LIQUOR INTO A CONCENTRATED PARTICULATE FRACTION AND A FILTRATE FRACTION

Ira M. Nathan, 275 Central Park West, New York, N.Y. 10024

Filed May 19, 1976, Ser. No. 687,847
Int. Cl.² B01D *33/26*
U.S. Cl. 210—77 **8 Claims**



1. An improvement in an apparatus for continuous filtration including a filter assembly including an essentially cylindrical housing having opposed end walls, a rotatable disc-shaped filter element dividing said housing into first and second chambers, a mother liquor entry port in said housing for introduction of mother liquor into said first chamber, a filtrate exit port in said housing for removal of filtrate from said second chamber, an essentially wedge-shaped member within said second chamber, said member extending from one of said end walls to said rotatable filter element, said member having a radially directed slot of essentially constant width therein, a backwash entry port positioned for introduction of backwash fluid into said slot in said member and against said filter element, an essentially wedge-shaped collector pocket within said first chamber, said wedge-shaped pocket having a leading wall and a rear wall each making contact with the other of said end walls and with said rotatable filter element, a backwash effluent port communicating with said pocket for outflow of suspended filter cake removed from said filter element by said backwash fluid, and driving means for rotating said disc-shaped filter element to introduce filter-cake into said pocket for removal by said backwash fluid, wherein said improvement comprises a serrated edge on said leading wall, said edge being that making contact with said filter element, said edge being divided into lands and grooves, said grooves being sized to permit filter cake to be carried by said filter element when in rotation from said first chamber into said pocket, while impeding the flow of mother liquor from said first chamber into said pocket or flow of backwash fluid from said pocket into said first chamber, depending on the relative pressures in the fluids in said pocket and in said first chamber, the leading edges of said lands being tapered to direct filter cake on said filter element when in rotation into adjacent grooves.

7. A method of operating an apparatus for continuous filtration including a plurality of filter assemblies each including an essentially cylindrical housing opposed end walls, a rotatable disc-shaped filter element dividing said housing into first and second chambers, a mother liquor entry port in said housing for introduction of mother liquor into said first chamber, a filtrate exit port in said housing for removal of filtrate from said second chamber, an essentially wedge-shaped member within said second chamber, said member extending from one of said end walls to said rotatable filter element, said member having a radially directed slot of essentially constant width therein, a backwash entry port positioned for introduction of backwash fluid into said slot in said member and against said filter element, an essentially wedge-shaped collector pocket within said chamber, said wedge-shaped pocket having a leading wall and a rear wall making contact with the other of

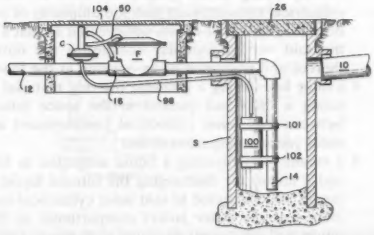
said end walls and with said rotatable filter element, a serrated edge on said leading wall, said edge being that making contact with said filter element, said edge being divided into lands and grooves, said grooves being sized to permit filter cake to be carried by said filter element when in rotation from said first chamber into said pocket, while impeding the flow of mother liquor from said first chamber into said pocket or flow of backwash fluid from said pocket into said first chamber, depending on the relative pressures in the fluids in said pocket and in said first chamber, the leading edges of said lands being tapered to direct filter cake on said filter element when in rotation into adjacent grooves, a backwash effluent port communicating with said pocket for outflow of suspended filter cake removed from said filter element by said backwash fluid, and driving means for rotating said disc-shaped filter element to introduce filter-cake into said pocket for removal by said backwash fluid, the direction of flow of mother liquor through successive filter assemblies being regarded as the reference stream in the use of the terms "upstream" and "downstream," wherein the improvement comprises the use of filter elements of smaller pore size in successive downstream filter assemblies, passing filtrate from each filter assembly to the mother liquor port of the next downstream filter assembly and repeating this step from the furthest upstream assembly to the furthest downstream filter assembly, passing the filtrate from the furthest downstream assembly into a filtrate sump, passing a portion of the filtrate from said filtrate sump to the backwash entry port of said furthest downstream assembly and successively through the backwash entry and exit ports of all assemblies, passing backwash fluid as particulate concentrate from the backwash exit port of the furthest upstream port to a particulate sump, passing particulate concentrate to the mother liquor entry port of the furthest upstream assembly, and continuing the process until the particulate concentrate reaches a desired concentration, and the filtrate reaches a desired freedom from particulate matter.

3,998,736

SEWAGE DISPOSAL SYSTEM

John W. Greenleaf, Jr., 1451 Brickell Ave., Miami, Fla. 33131

Filed May 12, 1976, Ser. No. 685,566
Int. Cl.² C02C *1/00*
U.S. Cl. 210—104 **11 Claims**



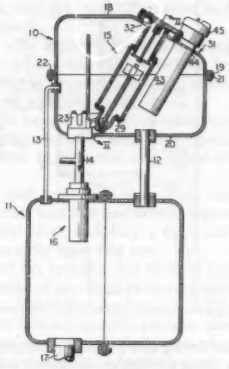
1. A vacuum type sewage disposal system comprising:
a sump at atmospheric pressure for reception and accumulation of sewage;
a discharge conduit communicating with a source of negative pressure and having an open intake end normally depending to a level below the surface of sewage within said sump;
a flow valve interposed in said discharge conduit for controlling the flow of fluid therethrough;
resilient means biasing said flow valve to a normally closed position in which it interrupts fluid flow through said discharge conduit;
means for opening said flow valve in opposition to said resilient means, said flow valve opening means defining a first variable volume chamber having a movable wall portion connected to said flow valve for movement in a direction to open said flow valve in response to the existence of a negative pressure within said chamber;
a control valve operatively connected to said chamber and to said discharge conduit on the side of said flow valve remote from said sump, said control valve being movable from a first position in which it vents said chamber to the atmosphere to a second position in which it establishes communication between said chamber and the discharge conduit;
means defining a second variable volume chamber having a movable wall portion connected to said control valve for retention of said control valve in its said second position in response to the existence of negative pressure in said second variable volume chamber;
and resilient means for restoring said control valve to its first position responsive to the existence of atmospheric pressure in said second variable volume chamber.

3,998,737

FILTER ARRANGEMENT WITH SPLIT HYDRAULIC TANK

Eugene E. Latimer, Wilmington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 25, 1975, Ser. No. 571,832
Int. Cl.² B01D *35/02*
U.S. Cl. 210—172 **3 Claims**



1. A fluid reservoir and filter combination comprising:
a first housing member and a second housing member, said members detachably secured together to define a fluid reservoir;
a fluid filter support assembly mounted within said reservoir;
said filter assembly comprising a filter support base mounted in and secured solely to one of said housing members;
a filter hold-down assembly mounted within and secured solely to the other of said housing members; and,
said filter hold-down assembly defining misalignment accommodating means for accommodating lateral misalignment of a filter element supported between said base and said hold-down assembly, and includes;
a removable cover secured to the other housing member over an opening therein for insertion and removal of a filter element,
an elongated cylindrical sleeve constructed and arranged so as to extend into an annular filter element,
an end plate in contact with the extended end of the sleeve,
means interconnecting the cover and end plate,

a collar slidably mounted on said sleeve for engaging the end of a filter element,

biasing means for biasing said collar along said sleeve into engagement with the end of a filter element,

said sleeve having a length extending within the interior of the filter element, and

means fixed relative to said one housing for extending into a filter element,

whereby said sleeve and said collar have radial dimensions defining sufficient clearance to accommodate large variations in axial alignment thereof relative to a filter element extending and supported between said base member and said hold-down assembly.

3,998,738

VACUUM DRYING AND DEGASSING

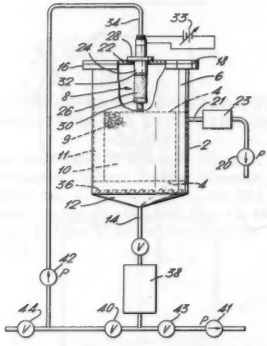
Roland Gregor Paul Kusay, Blechingley, England, assignor to BOC Limited, London, England

Continuation-in-part of Ser. No. 417,560, Nov. 20, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 546,073

Claims priority, application United Kingdom, Nov. 22, 1972, 53956/72

Int. Cl.² B01D 35/18

U.S. Cl. 210—180 **17 Claims**



1. In a vacuum drying and degassing apparatus for contaminated normally dielectric liquids, including means for supplying contaminated liquid at a chosen rate and pressure to the inlet of a permeable element heater; means for passing electric heating current through the body of the heater at a rate chosen to release heat within the body at a desired rate; a vacuum chamber enclosing the permeable element heater and having two outlets at different levels; a vacuum pump connected to the upper one of said outlets and adapted to produce subatmospheric pressures within the chamber; means for withdrawing treated liquid from the lower one of said outlet; the permeable element heater having a body of high-permeability, electrically conductive, material having an entry face for cool liquid and an exit face for heated liquid and degassed sorbate and water vapour, in which the exit face is exposed to the pressure in the vacuum chamber, the improvement comprising a liner of low-permeability, electrically resistive or electrically insulating material at the entry face of the permeable element heater body; wherein the flow impedance of the liner maintains pressure gradients through the heater body wherein a subatmospheric pressure of greater than about 20 torr is maintained on the exit face of the liner whereby the evolution of degassed sorbate and water vapor from the liquid is inhibited until after the liquid has passed through the said entry face.

3,998,739

APPARATUS FOR FILTRATION

Shinichiro Morimoto, Yokohama, and Osamu Abe, Kawaguchi, both of Japan, assignors to Kurita Water Industries Ltd., Osaka, Japan

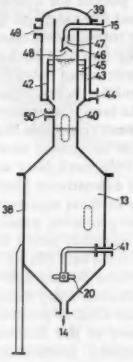
Filed July 29, 1974, Ser. No. 492,716

Claims priority, application Japan, Aug. 2, 1973, 48-86345; Aug. 2, 1973, 48-86346

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² B01D 23/10

U.S. Cl. 210—189 **3 Claims**



1. An apparatus for filtration, which comprises in combination

1 a filtration column consisting of

1 a vertical cylinder,

2 an inner cylindrical compartment disposed inside said vertical cylinder, erected so that the axis thereof falls in a vertical direction, provided in its side wall with a multiplicity of perforations for passage of liquid and possessed of an opening at the lower end

3 an outer jacket compartment disposed so as to have said inner cylindrical compartment concentrically surrounded thereby, provided in the zone of its side wall corresponding to the perforated zone of said inner cylindrical compartment with a multiplicity of perforations for passage of liquid, constructed so that a part of the said vertical cylinder constitutes the outer wall thereof and possessed of an opening at the lower end,

4 a filter bed having a granular filtering material constituting a filter bed packed in the space intervening between said inner cylindrical compartment and the outer jacket compartment and

5 a means for delivering a liquid subjected to filtration and a means for discharging the filtered liquid, which means are connected to said inner cylindrical compartment and the outer jacket compartment so that the liquid will be passed in radial directions, either outwardly or inwardly, from one of said two compartments to the other,

2 a washing column consisting of,

1 a storage barrel having a large inner volume and provided with a means for projecting the washing water; and

2 a washing head connected to and located above the upper portion of said storage barrel and provided therein with (a) a cylindrical outer wall whose upper end is closed; (b) an outer cylinder coaxially disposed inside said outer wall and connected to said outer wall at its bottom for thereby forming an annular empty portion closed at its bottom; (c) an inner cylinder coaxially disposed inside said outer cylinder and possessed of a greater height than said outer cylinder and

open at both ends thereof; (d) a pipe for delivery of the liquid subjected to washing so disposed that the discharge end thereof opens at a level higher than the upper end of said outer cylinder; and (e) an outlet disposed at the lower portion of said outer wall for discharging the spent washing water overflowing said outer cylinder,

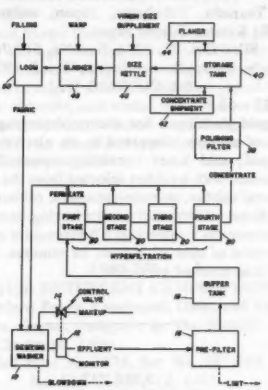
3 flow paths connecting the upper end and the lower end of said filtration column respectively to said washing column so as to permit conveyance of the granular filtering material between the columns and

4 a means adapted to cause the individual granules constituting said filter bed within said filtration column to be driven, while under simultaneous agitation, through the flow path into said washing column to be washed therein and convey the washed granules back to said filtration column in which they are packed to form a new filter bed.

3,998,740
APPARATUS FOR TREATMENT OF TEXTILE DESIZING EFFLUENT

Curtis C. Bost; Eugene Scott Irwin, both of Clemson; Thomas M. Keineth; Robert Q. Russell, both of Seneca; Harsch C. Ince, Jr., Greenville, all of S.C.; Gary L. Parsons, Gastonia, and James Keith Turner, Lincolnton, both of N.C., assignors to J. P. Stevens & Co., Inc., New York, N.Y. and Gaston County Dyeing Machine Company, Mount Holly, N.C.

Filed July 26, 1974, Ser. No. 492,173
Int. Cl.² B01D *31/00*
U.S. Cl. 210—195 S **6 Claims**

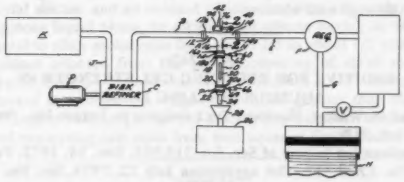


1. Apparatus for treating textile desizing effluent comprising means for maintaining said effluent at a substantially level size content, means at which said effluent is received as a feed for concentrating and separating a predominant portion of the effluent size content in an effluent concentrate portion, and means for recycling a remaining effluent permeate portion for textile desizing use, said concentrating and separating means being formed by a hyperfiltration system including at least four serially arranged stages yielding permeate in parallel and operating serially to increase the size content in and concentrate while passing degraded size with said permeate, the effluent feed to said serially arranged stages being initially and solely pressurized ahead of the first stage to control system pressure, and the size concentrate discharged at the last stage being controlled by valve means regulating said concentrate discharge suitably for reuse as textile sizing.

3,998,741
MAGNETICALLY ATTRACTABLE PARTICLE SEPARATOR

Graham D. Councell, 8242 Brookgreen Road, Downey, Calif. 90240

Filed Feb. 26, 1976, Ser. No. 661,782
Int. Cl.² B01D *35/06*
U.S. Cl. 210—222 **3 Claims**



1. A device for removing particles of a magnetically attractable material from liquid flowing through a line, which device includes:

a. a tubular rigid tee that includes first and second axially aligned legs, with a third leg being normally disposed relative to said first and second legs;

b. first means for connecting said tee to said line in such a manner that said liquid flows first through said first leg and then through said second leg, with said third leg being substantially vertically disposed;

c. a vertically disposed tubular member that has first and second ends, with said tubular member including a transparent window;

d. a first slide valve connected to said third leg and said first end of said tubular member, with said first slide valve normally being in an open position to permit said tubular member to fill with said liquid;

e. a second slide valve connected to said second end of said tubular member, said first slide valve normally being in a closed position to maintain said liquid in said tubular member;

f. a transverse shaft rotatably and sealingly supported in said tee intermediate said first and second legs and above said third leg, said shaft including a first end portion that projects outwardly from said tee;

g. power means for rotating said shaft in such a direction that the portion of said shaft most adjacent said third leg rotates towards said first leg;

h. a plurality of laterally spaced, circular, permanent magnets rigidly secured to said shaft, each of which magnets include a circumferential edge and a pair of side walls; and

i. an elongate non-magnetic resilient spring that has first and second end portions, said second end portion being in the form of a plurality of laterally spaced, parallel, rectangular strips, with each of said strips being defined by a first free end edge and a pair of side edges, and said second end portion including a plurality of second end edges that extend between said strips; and

j. means for so holding said spring from said first leg in said tee that said first end edges slidably engage said shaft, said side edges slidably engage said said walls, said second end edges slidably engage said circumferential edges, with said liquid as it flows through said tee having said particles of magnetically attractable material adhered to said magnets to be subsequently displaced therefrom upon contact with said spring to drop downwardly by force of gravity in said tubular member to accumulate therein above said second slide valve, and with said particles of magnetically attractable material that accumulates therein being discharged therefrom as said liquid continues to flow through said tee by placing said first slide valve in a closed position and second slide valve being in an open position to permit said particles of magnetically

attractable material to discharge from said tubular member by force of gravity, together with the quantity of said liquid in said tubular member, said second and first slide valves being successively placed in closed and open positions after said discharge to again permit said tubular member to fill with said liquid and said particles of magnetically attractable material accumulate therein, and said particles of magnetically attractable material as they move downwardly in said tubular member being visible through said window.

3,998,742

ADDITIVE FOR REDUCING GEL STRENGTH IN AQUEOUS DRILLING FLUIDS

Thad O. Walker, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 315,955, Dec. 18, 1972, Pat. No. 3,849,317. This application July 22, 1974, Ser. No. 490,435

The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.

Int. Cl.² C09K 7/02

U.S. Cl. 252—8.5 A 10 Claims

1. An aqueous drilling fluid having an aqueous phase containing less than 200 parts per million calcium dissolved therein and having a pH above 10, containing as the additive for reducing gel strength and yield point, hydrolyzed cereal solids which is comprised of from about 15% to about 25% by weight di-saccharides, tri-saccharides, tetra-saccharides, and penta-saccharides, and from about 75 to about 85% by weight hexa-saccharides and above.

3,998,743

METHOD AND SOLVENT COMPOSITION FOR STIMULATING THE PRODUCTION OF OIL FROM A PRODUCING WELL

George P. Maly, Newport Beach, Calif.; John A. Landess, deceased, late of Costa Mesa, Calif. (by Lynn H. Landess, executrix), and Thomas Foral, Brea, Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 7, 1973, Ser. No. 422,657

Int. Cl.² E21B 43/25; C23G 5/02

U.S. Cl. 252—8.55 B 3 Claims

1. A solvent composition for crude oil, waxes, asphaltenes, and resin precipitates of petroleum origin consisting essentially of about 45 to 85 volume percent of a normally liquid aliphatic hydrocarbon boiling in the range of about 120° F. to about 550° F. selected from the group consisting of kerosene and aviation turbine fuels; about 5 to 45 volume percent of a normally liquid aromatic hydrocarbon having a boiling point above about 175° F. selected from the group consisting of benzene, toluene, ethylbenzene, cumene, mesitylene and propylbenzene; about 0.5 to 6 volume percent of an ether of an aliphatic polyhydric alcohol containing at least one free hydroxyl group, having a boiling point above 212° F. and containing less than about 20 carbon atoms selected from the group consisting of ethylene glycol monobutyl ether and monomethyl ether diethylene glycol; and about 1 to 15 volume percent of a lower alkyl monohydric alcohol selected from the group consisting of methanol, ethanol, propanol, isopropanol and butanol.

3,998,744

OIL FRACTURING SPACING AGENTS

Vernon W. Arnold, Naperville, and Robert J. Lee, Dolton, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Apr. 16, 1975, Ser. No. 568,598

Int. Cl.² E21B 43/26

U.S. Cl. 252—8.55 R 6 Claims

1. Substantially spherical deformable oil-soluble resin spacing particles having a softening point within the range 200° to 325° F. and a mesh size between 4 to 20 mesh, said resin selected from the group consisting of oil-soluble homopolymers of 3, 4, dimethyl alpha methyl styrene and oil soluble copolymers wherein the monomer units are 3, 4, dimethyl alpha methyl styrene and 3, 5 dimethyl alpha methyl styrene.

3,998,745

METHOD FOR MANUFACTURING TRACTION MOTOR GEAR LUBRICANT

Norman R. Odell, Nederland; Melvin R. Hefty, Port Arthur; Clarence Vaughn, Groves, and Arthur W. Wammel, Beaumont, all of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 12, 1975, Ser. No. 549,265

Int. Cl.² C10M 1/24, 3/18, 5/14, 7/20

U.S. Cl. 252—41 5 Claims

1. A method for manufacturing a semi-fluid lubricant to a controlled apparent viscosity comprising

shearing a lithium soap base of about 14% soap content to disperse the soap and thicken the base and

diluting the soap base with lubricating oil to a soap content which results in a viscosity of from about 5,000 to 15,000 CP.

3,998,746

LIQUID DEVELOPER COMPRISING HEAT TREATED RUBBER FOR USE IN DEVELOPMENT OF AN ELECTROSTATIC LATENT IMAGE AND METHOD OF MAKING DEVELOPER

Terukuni Tsuneda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1974, Ser. No. 519,768

Claims priority, application Japan, Nov. 5, 1973, 48-124284

Int. Cl.² G03G 9/12

U.S. Cl. 252—62.1 L 19 Claims

1. A liquid developer for electrophotography consisting essentially of a toner dispersed in an electrically-insulating carrier liquid, said toner consisting essentially of colored particles coated with a rubber selected from the group consisting of natural rubber, styrene-butadiene rubber and vinyltoluene-butadiene rubber, said rubber having been subjected to a heat-treatment in a solvent at a temperature of at least 150° C. for a period of time of at least 10 minutes. Prior to being coated on said colored particles.

3,998,747

COLOR TONER FOR ELECTROPHOTOGRAPHY

Hiroshi Yamakami, Tokyo; Kaichi Tsuchiya, Fuchu, and Seizi Tomari, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 26, 1974, Ser. No. 509,740

Claims priority, application Japan, Oct. 2, 1973, 48-110734; Oct. 8, 1973, 48-113064; Aug. 22, 1974, 49-96501

Int. Cl.² G03G 9/12

U.S. Cl. 252—62.1 R 11 Claims

1. A negatively charged toner for electrophotography having enhanced properties of negative chargeability and color purity which comprises a saturated or unsaturated polyester resin having a softening point of from 80° to 150° C and produced from a polyol component and a dicarboxylic acid component and an organic pigment selected from the group consisting of a phthalocyanine type cyan organic pigment, and a benzidine type yellow organic pigment.

3,998,748

PIEZOELECTRIC CERAMIC COMPOSITIONS

Masamitsu Nishida, Osaka, and Hiromu Ouchi, Toyonaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Tokyo, Japan

Filed July 16, 1975, Ser. No. 596,563

Claims priority, application Japan, July 18, 1974, 49-82826; July 18, 1974, 49-82827; Aug. 16, 1974, 49-94541

The portion of the term of this patent subsequent to Aug. 20, 1991, has been disclaimed.

Int. Cl.² C04B *35/46, 35/48*

U.S. Cl. 252—62.9 2 Claims

1. A piezoelectric ceramic composition consisting essentially of a solid solution of a material represented by the formula:

$$Pb(Zn_{1/3}Nb_{2/3})_A(Sn_{1/3}Nb_{2/3})_BTi_CZr_DO_3$$

wherein the ranges for A, B, C and D are $0.01 \leqq A \leqq 0.50$, $0.01 \leqq B \leqq 0.25$, $0.25 \leqq C \leqq 0.625$ and $0.20 \leqq D \leqq 0.625$, and wherein $A + B + C + D = 1$, and further containing 0.05 to 5 weight percent of manganese dioxide (MnO_2) and 0.3 to 3 weight percent of niobium oxide (Nb_2O_5).

3,998,749

CHEMICAL HEATER FORMULATION AND METHOD FOR GENERATING HEAT

William R. Hydro, Bel Air, and Benjamin Witten, Baltimore, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 6, 1974, Ser. No. 504,009

Int. Cl.² C09K *5/00;* F24J *1/04*

U.S. Cl. 252—70 8 Claims

1. A chemical heater reactant formulation for generation of an exotherm through the exothermic reduction of cupric chloride by aluminum consisting essentially of a reaction system solution of cupric chloride; ethylene glycol as a solvent for said cupric chloride; and water, and a source of aluminum for initiating said reaction selected from the group consisting of aluminum foil, an aluminum powder-paper pad composition and aluminum powder.

3,998,750

LIQUID DETERGENT COMPOSITION

Nicholas Stockford Payne, Cincinnati, Ohio, and Ronald Lynn Bailey, Kobe, Japan, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed June 30, 1975, Ser. No. 592,009

Int. Cl.² C11D *1/12, 1/83*

U.S. Cl. 252—108 10 Claims

1. A homogeneous, single-phase, heavy-duty liquid detergent composition, comprising:

a. from about 10% to about 40% by weight based on the free acid form of an anionic detersive surfactant, or mixtures thereof;

b. sufficient magnesium ion or calcium ion, or mixtures thereof, to provide electrical neutrality for said anionic surfactant;

c. from about 10% to about 50% by weight of an ethoxylated nonionic detersive surfactant, or mixtures thereof;

d. an effective amount of a water-soluble bis(styrylsulfonate)biphenyl brightener or water-soluble salt thereof;

e. the balance of the composition comprising a liquid carrier selected from water or mixtures of water and water-soluble solvents,

said composition being substantially free of agents at levels which cause phase separation or brightener precipitation.

3,998,751

SOLID OXIDIZING COMPOSITIONS

William Bruce Murray, 7100 Sea Wind Drive, Long Beach, Calif. 90803

Filed Oct. 21, 1974, Ser. No. 516,187

Int. Cl.² C11D *7/54*

U.S. Cl. 252—187 H 9 Claims

1. A method for the preparation of an oxidant-containing solid consisting essentially of the reaction product of an alkali metal silicate and an oxidant which comprises contacting, in aqueous liquid phase, an alkali metal silicate having an alkali metal to silica molar ratio from about 2/1 to about 1/5 with an oxidant selected from the group consisting of alkali metal hypochlorites, hypobromites, hypoiodites and mixtures thereof at a maximum weight ratio of no greater than about 0.72 parts oxidant per part of silicate to precipitate said solid and separating said solid from said aqueous liquid phase.

3,998,752

INFRARED REFLECTIVE COATING FOR VISIBLE LIGHT TRANSMITTING SUBSTRATES

Gottfried Haacke, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 27, 1976, Ser. No. 661,885

Int. Cl.² F21V *9/04*

U.S. Cl. 252—300 3 Claims

1. A method for increasing the near infrared reflectivity of a Cd_2SnO_4 film comprising incorporating copper into the Cd_2SnO_4 in an amount to form $Cd_{2-x}Cu_xSnO_4$ where x is from 0.01 to about 0.3.

3,998,753

WATER DISPERSIBLE CAROTENOID PREPARATIONS AND PROCESSES THEREOF

Thomas William Antoshkiw, Kearny; Marco Alfred Cannalonga, Fort Lee, and Arnold Koff, West Orange, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 13, 1974, Ser. No. 497,025

Int. Cl.² B01J *13/00;* B01F *3/00;* A23L *1/27*

U.S. Cl. 252—312 21 Claims

1. A process for the preparation of a water-dispersible carotenoid-containing powder wherein the carotenoid has a particle size of less than 0.1 micron which comprises the steps of

a. forming a solution of a carotenoid and an antioxidant in a volatile organic solvent for the carotenoid, said volatile organic solvent selected from the group consisting of halogenated aliphatic hydrocarbons, benzene and carbon disulfide;

b. forming an aqueous solution of sodium lauryl sulfate, a water-soluble carrier composition, a preservative and a stabilizer, and adjusting said solution to a pH of about 10 to 11;

c. forming an emulsion of the solutions of steps (a) and (b) using both mixing at a high speed and high shear;

d. removing the organic solvent while maintaining both high speed mixing and high shear;

e. adjusting the solids content of the emulsion using water and

f. spray-drying the resulting emulsion to obtain the water-dispersible, carotenoid-containing powder.

3,998,754

SURFACE ACTIVE QUATERNARY HIGHER DIALKYL PHOSPHONIUM SALTS

Alexis A. Oswald, Mountainside, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed July 31, 1974, Ser. No. 493,253

Int. Cl.² B01F *17/00*

U.S. Cl. 252—351 19 Claims

1. Quaternary phosphonium chlorides of the formula:

$$[R_3'P^+R_3''] Cl^- \quad (HCl)_x$$

wherein R′ is a C_8 to C_{30} high open chain alkyl, and R″ is a C_1 to C_4 low aliphatic hydrocarbyl group selected from the group consisting of open chain alkyl, alkenyl and alkinyl groups, x is 0 or 1; all the groups being independently selected, except, that in case the R′ groups are dodecyl or tetradecyl and x is 0 the R″ groups cannot both be methyl.

3. A composition of increased surface activity containing as a minor component a surface active quaternary higher dialkyl lower dialkyl phosphonium salt of the formula:

$$[R_2'P^+R_2''] X^- \quad (HX)_x$$

wherein R′ is a C_8 to C_{30} high alkyl group, R″ is a C_1 to C_4 low aliphatic hydrocarbyl independently selected from the group consisting of open chain alkyl, alkenyl and alkinyl, X is an anion selected from the group consisting of halides, phosphates, phosphites, sulfates, tetrafluoroborate, nitrites, nitrates, C_1–C_{30} carboxylates, organic phosphates, phosphonates, phosphites, C_1 to C_{30} hydrocarbon sulfonates and C_1–C_{24} alkyl sulfates, and x is 0 or 1; in effective surfactant amounts the major component being selected from the group of water and organic liquids.

3,998,755
REGENERATION OF A COKE-DEACTIVATED, ACIDIC BIMETALLIC PT-1R CATALYST

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 139,911, May 3, 1971, Pat. No. 3,935,244, which is a continuation-in-part of Ser. No. 844,200, July 23, 1969, Pat. No. 3,622,520, which is a continuation-in-part of Ser. No. 805,380, March 7, 1969, abandoned. This application May 3, 1974, Ser. No. 466,754

The portion of the term of this patent subsequent to Nov. 23, 1988, has been disclaimed.

Int. Cl.² B01J *23/96;* **C10G** *35/08*

U.S. Cl. 252—415 **11 Claims**

1. A method for regenerating a deactivated hydrocarbon conversion catalyst comprising a labile sulfur-free combination of a refractory inorganic oxide carrier material, chlorine and a metallic component consisting essentially of catalytically effective amounts of platinum, palladium or mixtures thereof and iriduim, said catalyst containing on an elemental and carbon-free basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % iridium and about 0.1 to about 3.5 wt. % chloringe the catalyst having been deactivated by the deposition of carbonaceous materials thereon during a previous contacting with a hydrocarbon charge stock at hydrocarbon conversion conditions, said method comprising the sequential steps of:

a. contacting the deactivated catalyst with a substantially sulfur-free first gaseous mixture containing O_2, H_2O and HCl—the amount of O_2 being about 0.2 to about 3 mole % thereof and the mole ratio of H_2O to HCl contained therein being selected from the range of about 5:1 to about 100:1—at a temperature of about 375° to about 450° C. for a period sufficient to substantially remove said carbonaceous materials;

b. treating the catalyst resulting from step (a) by contacting it with a substantially sulfur-free second gaseous mixture containing O_2, H_2O and HCl—the amount of O_2 being about 0.2 to about 25 mole % thereof and the mole ratio of H_2O to HCl contained therein being selected from the range of about 5:1 to about 100:1—at a temperature of about 450° to about 550° C. for a period of about 0.5 to about 10 hours;

c. purging oxygen from contact with the catalyst from step (b); and,

d. subjecting the catalyst resulting from step (c) to contact with a substantially sulfur-free third gaseous mixture comprising hydrogen, H_2O and HCl—the mole ratio of H_2O to HCl being selected from the range of from about 5:1 to about 500:1—at a temperature of about 300° to 600° C. for a final period of about 0.5 to about 5 hours, thereby producing a regenerated hydrocarbon conversion catalyst having activity, selectivity and stability characteristics comparable to those possessed initially by the fresh catalyst.

3,998,756
PREPARATION OF ACTIVATED CARBONACEOUS MATERIAL FROM SEWAGE SLUDGE AND SULFURIC ACID

Gordon Sutherland, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed June 17, 1974, Ser. No. 480,200

Int. Cl.² B01J *37/00, 21/18*

U.S. Cl. 252—422 **4 Claims**

1. The process for preparing activated carbonaceous material which comprises:

a. adding sulfuric acid to sewage sludge containing at least 3% by weight of solids, in an amount of at least about 50% by weight, based on the dry weight of the sewage sludge solids; and

b. heating the resulting mixture in the presence of air at a temperature of from about 150° to about 350° C. a powdered carbonaceous material is produced.

3,998,757
LITHIUM FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

Alan W. Foster, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed May 19, 1975, Ser. No. 578,538

Int. Cl.² B01J *21/04, 23/78, 23/86*

U.S. Cl. 252—465 **11 Claims**

1. An oxidative dehydrogenation catalyst composition containing a lithium ferrite for use in oxidative dehydrogenation of organic hydrocarbons consisting essentially of lithium, iron and oxygen; lithium, iron, oxygen and aluminum or chromium, or lithium, iron, oxygen, aluminum and chromium, the mole ratio of lithium to iron being in the range between 2:5 to 1:7, said catalyst having a surface area of greater than 8.1 m^2/gram.

3,998,758
SUPPORTED CATALYST

Robert A. Clyde, Box 430820, South Miami, Fla. 33143

Continuation-in-part of Ser. No. 334,261, Feb. 21, 1973, Pat. No. 3,900,646. This application Aug. 18, 1975, Ser. No. 605,677

Int. Cl.² B01J *21/04, 23/74, 35/04*

U.S. Cl. 252—466 J **11 Claims**

1. A novel catalyst comprising:

a. a ceramic sponge support having intern.l surfaces comprised of the walls of cavities randomly dispersed throughout the sponge support and the walls of interstitial passageways connecting said cavities;

b. a first layer of either nickel, copper or cobalt substantially uniformly deposited on and adherent to all internal surfaces of the ceramic sponge support;

c. a second layer comprising a lattice network of either nickel, copper or cobalt adherent to and on the surface of said first layer; and

d. a sufficient quantity of either aluminum, magnesium or zinc intermittently dispersed throughout the second layer to retain the integral structure of said lattice network.

3,998,759
METHOD OF CATALYST MANUFACTURE

James Hoekstra, Evergreen Park, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 29, 1975, Ser. No. 545,064

Int. Cl.² B01J *29/06, 23/62, 23/08*

U.S. Cl. 252—466 PT **13 Claims**

1. In the method of catalyst manufacture wherein a refrac-

tory inorganic oxide carrier is commingled with a common solution of a compound of a metal selected from Groups IVA, IB, VIB, VIIB and VIII of the Periodic Table and a sulfur-containing carboxylic acid selected from the group consisting of carbothiolic, carbothionic, carbodithiolic and mercapto-carboxylic acids, to deposit said metal compound on the outer surface of said carrier, the improvement, which comprises aging said common solution, prior to its commingling with said carrier, for a period of from about 5 minutes to about 24 hours at a temperature of from about 25° to about 100° C., the aging time decreasing with increasing temperature.

8. The method of claim 1 further characterized in that said carrier is alumina.

12. The method of claim 1 further characterized in that said metal compound is a platinum group metal compound.

3,998,760

MODIFIED ZINC FERRITE OXIDATIVE DEHYDROGENATION CATALYSTS

Harold F. Christmann, Seabrook, and Edward J. Miklas, Conroe, both of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Sept. 3, 1974, Ser. No. 502,382
Int. Cl.² B01J 23/34; C07C 5/48
U.S. Cl. 252—471 3 Claims

1. A catalyst composition suitable for oxidative dehydrogenation of organic compounds consisting essentially of a zinc ferrite composition having the empirical formula

$$Zn_xFe_yO_z$$

wherein x is from about 0.1 to 2, y is from about 0.3 to about 12 and z is from about 3 to about 18 and a promoter of magnesium oxide in an amount of from about 0.1 to about 10 weight percent and manganese oxide in an amount of about 0.1 to about 10 wt. percent based on the weight of the zinc ferrite composition.

3,998,761

SHAMPOO COMPOSITIONS CONTAINING BEER SOLIDS

Herbert H. Gary, Edison; William Bess, Lindhurst, and Frederick Hubner, Edison, all of N.J., assignors to Bristol-Myers Company, New York, N.Y.

Continuation of Ser. No. 372,551, June 22, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,328
Int. Cl.² C11D 3/26; A61K 7/08
U.S. Cl. 252—544 7 Claims

1. A shampoo composition suitable for conditioning hair comprising at least one detergent and a waste liquid beer sludge concentrate distributed in an aqueous medium, the beer solids contained in said composition comprising from about 4% to 20% by weight based on the total weight of the shampoo composition and wherein said detergent comprises about 10 to 20% based on the total weight of the composition.

3,998,762

GRANULAR OR POWDERY DETERGENT COMPOSITION

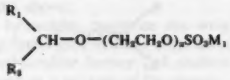
Moriyasu Murata, Chiba; Makoto Yamanaka, Koganei; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,194
Claims priority, application Japan, Nov. 20, 1974, 49-133463
Int. Cl.² C11D 1/37, 3/065
U.S. Cl. 252—551 3 Claims

1. A granular or powdery detergent composition consisting essentially of

I. from 1 to 50 percent by weight of a first surfactant having a tendency to cake selected from the group consisting of

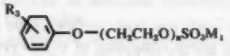
(a) alkylethoxy sulfates having the formula



wherein R_1 and R_2, which can be the same or different, are hydrogens, alkyls having one to 21 carbon atoms, or alkenyls having one to 21 carbon atoms, provided that

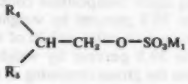
number of from 1 to 50, and M_1 is an alkali metal or an alkaline earth metal,

b. alkylphenylethoxy sulfates having the formula

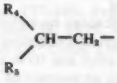


wherein R_3 is alkyl having 4 to 16 carbon atoms or alkenyl having 4 to 16 carbon atoms, and n and M_1 are the same as defined above,

c. branched alkyl sulfates having the formula

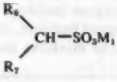


wherein R_4 and R_5, which can be the same or different, are alkyls having one to 20 carbon atoms or alkenyls having one to 20 carbon atoms, provided that



and M_1 is the same as defined above

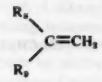
d. alkane sulfonates having the formula



wherein R_6 and R_7, which can be the same or different, are hydrogens, or alkyls having one to 21 carbon atoms, provided that

contains 10 to 22 carbon atoms, and M_1 is the same as defined above

e. sulfonic acid salts of olefins having the formula



wherein R_8 and R_9, which can be the same or different, are alkyls having one to 21 carbon atoms, provided that the number of carbon atoms in the olefine molecule is from 10 to 22, and the salt-forming cation is an alkali metal or alkaline earth metal,

f. sulfonic acid salts of olefins having the formula

wherein R_{10} and R_{11}, which can be the same or different, are hydrogens or alkyls having one to 19 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 22 and further provided that in up to 80 % of the olefin molecules, one of R_{10} and R_{11} can be hydrogen, and in the balance of the olefin molecules, neither of R_{10} and R_{11} is hydrogen, and the salt-forming cation is an alkali metal or alkaline earth metal,

g. ethylene oxide non-ionic surface active agents selected from the group consisting of polyoxyethlene (1–30) alkyl (C_{12} to C_{18}) or alkenyl (C_{12} to C_{18}) ethers, polyoxethylene (1.5 to 30) alkyl (C_8 to C_{16}) phenyl ethers, polyoxyethylene (8–30) saturated or unsaturated fatty acid (C_{10} to C_{22}) esters and polyoxyethylene (4–30) sorbitan saturated or unsaturated fatty acid (C_{10} to C_{22}) esters,

and mixtures thereof,

II. an anti-caking agent composition consisting of

a. from 0.2 to 39.8 percent by weight of polyethylene glycol having a molecular weight of at least 2000, and

b. from 0.2 to 39.8 percent by weight of a substance selected from the group consisting of sulfosuccinic acid and its alkali and alkaline earth metal salts, maleic anhydride, maleic acid and its alkali and alkaline earth metal salts, succinic anhydride, succinic acid and its alkali and alkaline earth metal salts, and mixtures thereof, the sum of A and B being from 0.4 to 40 percent by weight, based on the weight of the detergent composition, and

III. from zero to 35 percent by weight of second surfactant selected from the group consisting of alkylbenzene sulfonates in which the alkyl has 10 to 16 carbon atoms, linear alkyl sulfates having an average of 11 to 18 carbon atoms, α-olefin sulfonates having 10 to 20 carbon atoms and mixtures thereof, wherein the sum of the first and second surfactants does not exceed 50 percent by weight, based on the weight of the detergent composition, and

IV. the balance of the composition is water-soluble inorganic alkaline detergent builders, or water-soluble inorganic neutral detergent builders, or water-soluble organic detergent builders, or mixtures thereof.

3,998,763
CURABLE EPOXY COMPOSITION

Bernd Bohnel, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 19, 1975, Ser. No. 578,989
Int. Cl.² C08G 59/40
U.S. Cl. 260—2 EC **16 Claims**

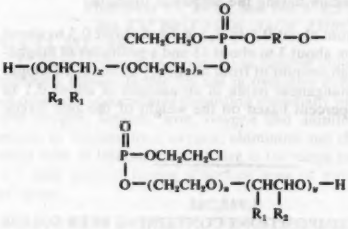
1. A storage stable, moisture and room temperature curable epoxy resin composition comprising curable materials comprising epoxy resin, a salt of bis(fluoroalkylsulfonyl)methane or fluoroalkylsulfonic acid as a latent catalyst for the curing of said curable materials, an amount of phosphorus pentoxide to produce upon hydration thereof sufficient phosphoric acids to activate said latent catalyst when said composition is applied, and a base which is inert with respect to said curable materials, catalyst, and phosphorus pentoxide and is present in an amount sufficient to react and form salts with phosphoric acids formed by hydration of said phosphorus pentoxide upon contact thereof with adventitious moisture during preparation and storage of said composition, said base having the formula $R_1R_2R_3P$, where R_1, R_2 and R_3 are aliphatic groups.

3,998,764
REDUCING FLAMMABILITY OF POLYURETHANE FOAMS WITH PHOSPHORUS COMPOUNDS

Hartfrid Vollmer, Erftstadt Liblar; Franz-Josef Dany, Erftstadt Lechenich, and Joachim Wortmann, Turnich, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 6, 1974, Ser. No. 521,501
Claims priority, application Germany, Nov. 9, 1973, 2356033
Int. Cl.² C08G 18/14, 18/38, 18/32
U.S. Cl. 260—2.5 AJ **4 Claims**

1. A process for making polyurethane moulding compositions of reduced flammability by subjecting an organic polyol and a flameproofing agent containing alcoholic OH-groups to condensation with equivalent quantities of an organic isocyanate compound, in the presence of activators, expanding agents and cell regulators, which comprises using as the flameproofing agent a compound of general formula (I)



in which R represents phenylene, or alkyl- or halogen-alkyl-substituted diphenylene methane, R_1 and R_2, respectively, stand for a hydrogen atom, an alkyl radical or a halogen-substituted alkyl radical having from 1 to 4 carbon atoms, $x + y$ stand for a number between 0.1 and 3, and n stands for 1 or 2.

3,998,765
METHOD OF PREPARING PHENOLALDEHYDE FOAMED PLASTICS

Viktor Alexeevich Novak, Suzdalskoe shosse, 15a, kv. 29; Jury Semenovich Murashov, ulitsa Mira, 92, kv. 16; Vasily Dmitrievich Vaigin, ulitsa Truda, 18, kv. 4, and Vsevolod Vasilievich Baranov, ulitsa Mira, 92, kv. 9, all of Vladimir, U.S.S.R.

Filed Oct. 3, 1974, Ser. No. 511,650
Claims priority, application U.S.S.R., Oct. 8, 1973, 1965061
Int. Cl.² C08J 9/28
U.S. Cl. 260—2.5 F **7 Claims**

1. A method of preparing phenolaldehyde foamed plastics having low water-absorbing properties comprising mixing a phenolaldehyde oligomer consisting of 100–15 parts by weight of a resol resin and 0–85 parts by weight of a novolac resin, with an acidic catalyst selected consisting essentially of (A) an oligomeric product obtained by the treatment of an aromatic sulphoacid with formaldehyde, or (B) an oligomeric product obtained by the treatment of an aromatic sulphoacid with formaldehyde and a nitrogen-containing compound selected from the group consisting of an amine and an amide, a complex-forming metal selected from the group consisting of cobalt, magnesium, manganese, vanadium, chromium, nickel, copper, iron, titanium, and lead and in the form of its oxide,

hydroxide, salt, or mixtures thereof, a surfactant and a foaming agent, and then foaming and curing the mixture at a temperature up to 100° C.

3,998,766

URETHANE MODIFIED CARBODIMIDE-ISOCYANURATE FOAMS FROM ORGANIC POLYISOCYANATES AND OXYALKYLATED MANNICH POLYOLS

Peter T. Kan, Plymouth; Moses Cenker, Trenton, and John T. Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 26, 1974, Ser. No. 536,605
Int. Cl.² C08G *18/14, 18/50*
U.S. Cl. 260—2.5 AQ 5 Claims

1. A process for the preparation of a foam characterized by carbodiimide, isocyanurate and urethane linkages which comprises reacting in the absence of a catalyst which promotes the carbodiimide or isocyanurate reactions an organic polyisocyanate with an oxyalkylated Mannich polyol having a hydroxyl number of from 100 to 900 and a nitrogen content of from 1% to 15% by weight employing an NCO/OH equivalent ratio of from about 2:1 to 10:1.

3,998,767

FAST CURING OF ARYLENE SULFIDE POLYMER USING HEXAMETHOXYMETHYLMELAMINE

Roger J. Walton, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 2, 1975, Ser. No. 609,635
Int. Cl.² C08J *9/10*
U.S. Cl. 260—2.5 D 15 Claims

1. A composition of matter comprising an arylene sulfide polymer and 0.05 to 10 weight percent based on the weight of said arylene sulfide polymer of hexamethoxymethylmelamine.

3,998,768

THERMOSETTING POWDER COATING COMPOSITION OF A BLEND OF ACRYLIC POLYMERS HAVING DIFFERENT GLASS TRANSITION TEMPERATURES AND A BLOCKED POLYISOCYANATE CROSS-LINKING AGENT

Paul H. Pettit, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 24, 1974, Ser. No. 536,321
Int. Cl.² C08K *5/10*; C08L *1/14, 33/14, 75/04*
U.S. Cl. 260—17 R 12 Claims

1. A thermosetting polymer powder coating composition comprising finely divided particles having a particle size of 1–100 microns; wherein the particles consist essentially of an intimately mixed blend of

A. 20–70% by weight of a hard acrylic polymer consisting essentially of

1. 80–95% by weight, based on the weight of the acrylic polymer, of methyl methacrylate, styrene or a mixture of a methyl methacrylate and styrene,
2. 5–20% by weight, based on the weight of the acrylic polymer, of a hydroxy alkyl acrylate or hydroxy alkyl methacrylate having 2–4 carbon atoms in the alkyl groups or a mixture of said acrylate and said methacrylate;

wherein the hard acrylic polymer has a glass transition temperature of about 70°–103° C., a weight average molecular weight of 5,000–20,000 and a hydroxyl content of about 0.5–3% by weight.

B. 5–20% by weight of a soft acrylic polymer consisting essentially of

1. 30–62% by weight, based on the weight of the soft acrylic polymer, of methyl methacrylate, styrene or a mixture of methyl methacrylate and styrene;
2. 35–60% by weight, based on the weight of the soft acrylic polymer, of an alkyl acrylate having 2–12 carbon atoms in the alkyl group, an alkyl methacrylate having 4–12 carbon atoms in the alkyl group or a mixture of the above;
3. 3–10% by weight, based on the weight of the soft acrylic polymer of a hydroxy alkyl acrylate, a hydroxy alkyl methacrylate having 2–4 carbon atoms in the alkyl group or a mixture of the above;

wherein the soft acrylic polymer has a glass transition temperature of −20° to 15° C., a weight average molecular weight of 5,000–50,000 and a hydroxyl content of about 0.5–2% by weight;

C. 15–30% by weight of a blocked organic polyisocyanate of an organic polyisocyanate blocked with an organic ketoxime blocking agent; wherein the organic polyisocyanate is an aliphatic polyisocyanate or a cycloaliphatic polyisocyanate and the ketoxime blocked organic polyisocyanate is stable below 50° C. and breaks down under moderate baking conditions to provide reactive isocyanate groups;

D. 10–30% by weight of hydroxy functional plasticizer having a hydroxyl number of 18–300, and a number average molecular weight of about 500–6,000 and wherein the functional plasticizer is a polyester of an alkylene glycol or a mixture of alkylene glycols and an aliphatic, alicyclic or aromatic dicarboxylic acid or a mixture of these acids;

E. a catalytic amount of an organometallic compound;

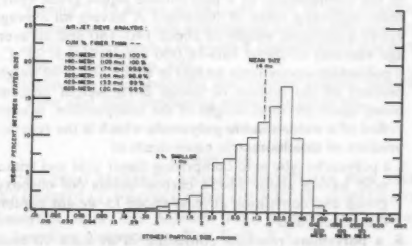
wherein the molar ratio of NCO/OH for all of the above is about 0.9/1 to about 1.3/1.

3,998,769

MICA, FREE, CRACK-RESISTANT DRYING TYPE JOINT COMPOUND

Marvin K. Lane, Chicago, and Winton C. Anderson, Elk Groove Village, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 277,446, Aug. 2, 1972, abandoned. This application Dec. 24, 1975, Ser. No. 644,213
Int. Cl.² C08L *3/02*
U.S. Cl. 260—17.4 ST 5 Claims



1. A crack-resistant, drying type joint compound adapted for use in finishing joints between wallboards when mixed with water, comprising a mixture of terra alba in an amount from about 80% to about 95% of the weight of the total composition, a thickener, and a binder, in an amount from about 2% to about 10% of the weight of the total composition, said terra alba being characterized by a size distribution sufficient to prevent cracking without the addition of mica, whereby said joint compound is essentially free of mica.

3,998,770

PROCESS FOR REDUCING DISCOLORATION AND DARK SPOTTING IN TETRAFLUOROETHYLENE RESIN MOLDED PARTS

Satish Chandra Malhotra, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1975, Ser. No. 645,217
Int. Cl.[2] C08L 5/00; C08K 9/04
U.S. Cl. 260—17.4 SG 13 Claims

1. In the process for preparing glass filled agglomerated granules of non-melt-fabricable granular tetrafluoroethylene polymer by agitating a finely-divided blend of said granular tetrafluoroethylene polymer and said glass filler in which the average particle size of the finely-divided tetrafluoroethylene polymer is below about 200 microns and in which the glass filler is present in an amount between about 5% and 40% by volume based on volume of polymer and filler in a two-phase liquid medium consisting essentially of water and an organic liquid which is soluble in water up to at most 15% by weight at the operating temperature of the process and which has a surface tension no greater than about 40 dynes/cm. at 25° C., and in which the oganic liquid is present in an amount of 0.1 to 0.5 cc per gram of said blend and in which the resulting glass filled agglomerated granules are separated from the liquid medium, the improvement wherein said liquid medium additionally contains a silicone present in an amount of between 0.01% and 0.5% by weight based on weight of said blend, and a complexing agent selected from sugars, hydroxy-organic acids or amino-organic acids present in an amount effective to complex with iron impurity.

3,998,771

WATER-BASED EPOXY RESIN ZINC-RICH COATING COMPOSITIONS

Thomas John Fenelis, Jr., Freehold, and Miles Talmadge Bryant, Highland Park, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,164
Int. Cl.[2] C08J 3/20
U.S. Cl. 260—18 PN 6 Claims

1. A water-based epoxy/polyamide resin zinc-rich coating composition comprising:

a. about 2–10 weight percent, based upon the total weight of the composition, of a non-volatile liquid grade epoxy resin diglycidyl ether of bisphenol A having an average epoxy equivalent weight of about 140–480 and an average viscosity of about 100–16,000 centipoises at 25° C.;

b. a polyamide-epoxy resin adduct in which about 90 weight percent of the adduct or about 2–10 weight percent, based upon the total weight of the composition, is comprised of a water-soluble polyamide which is the reaction product of stoichiometric equivalents of

i. a polycarboxylic acid comprising dimer acid and trimer acid having about 18–54 carbon atoms per carboxyl group and containing at least about 75 weight percent dimer acid and

ii. a polyamine reactant consisting of at least 10 mole percent poly(oxyalkylene)amine having 2–8 carbon atoms between adjacent ether oxygen atoms and the remainder of poly(alkylene)amine having a 4–8 carbon atoms per primary amine group

and in which 10 weight percent of the adduct or about 0.1–3.0 weight percent, based upon the total weight of the composition, is an epoxy resin as defined in (a); and

c. about 55–70 weight percent, based upon the total weight of the composition, of zinc dust having an average particle size of about 2–15 microns.

3,998,772

NOVEL RUBBER LATICES AND METHOD OF PRODUCING SAME

Alan Beerbower, 1400 Lamberts Mill Road, Westfield, N.J. 07090; Gilbert W. Burton, 1179 Puddingstone Road, Mountainside, N.J. 07092, and Paul L. Malloy, 408 Grove St., Westfield, N.J. 07090

Continuation-in-part of Ser. No. 509,860, Sept. 27, 1974, abandoned. This application July 25, 1975, Ser. No. 599,065
Int. Cl.[2] B01F 17/00; C08L 91/00; C11D 9/04
U.S. Cl. 260—23.7 A 18 Claims

1. A process of preparing a mechanically stable coagulable low unsaturation elastomer latex which consists essentially in admixing a butyl rubber or EPDM elastomer hydrocarbon solvent cement with water and an emulsifier composition consisting essentially of 0.5 to 8.0 parts per hundred parts of elastomer of an ammonium or alkali metal soap of a fatty acid containing 12 to 24 carbon atoms or mixtures of such fatty acids and as a second stabilizer additive 0.5 to 6.0 parts per hundred parts of elastomer of an ammonium, alkali metal, or amine salt of a long chain alpha olefin polymer or copolymer substituted organic unsaturated aliphatic mono or dicarboxylic acid or anhydride thereof, said long chain alpha olefin polymer or copolymer salts having a number average molecular weight between about 500 and about 3500, homogenizing and shearing said admixture into an emulsion, removing hydrocarbon solvents therefrom and recovering said latex, the latex being characterized as a low viscosity latex having a solids content of 50 to 68 percent by weight and a coagulum of less than about 1.5 percent by weight.

3,998,773

HYDRAULIC CEMENT COMPOSITION

Oliver W. Crinkelmeyer, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 14, 1975, Ser. No. 558,569
Int. Cl.[2] C04B 7/00; C08J 3/06; C08L 71/02
U.S. Cl. 260—29.2 EP 2 Claims

1. A hydraulic cement composition which comprises:

a. a hydraulic cement;

b. based on 100 parts by weight of said hydraulic cement; about 35 to about 65 parts of water; from about 0.6 to about 2 parts of polyethylene oxide having a molecular weight of at least about 300,000, and from about 0.5 to about 2.5 parts of an alkali metal salt of the condensation product of mononaphthalene sulfonic acid and formaldehyde.

3,998,774

ETHYLENE-VINYL HALIDE-ALKYL VINYL TERPOLYMER EMULSIONS

Glenn E. Teer; Jerry G. Higgins, and George D. Warren, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Big Spring, Tex.

Filed Feb. 18, 1975, Ser. No. 550,375
Int. Cl.[2] C08L 23/02
U.S. Cl. 260—29.6 T 24 Claims

1. A process for producing stable polymer emulsions of polymer particles comprising mixtures of polyethylene and terpolymers of ethylene, a vinyl halide monomer, and an alkyl vinyl monomer, having molecular weights in the range of from about 2,000 to 20,000 and particle size in the range of from about 100 to 1,000 angstroms which includes contacting ethylene, maintained at a pressure in the range of from about 1,400 to 20,000 psi, with an aqueous reaction medium comprising said vinyl halide monomer, and an alkyl vinyl monomer having from about 3 to about 24 carbon atoms and having a pH of about 8.5 to 14.0 at a temperature in the range of from about 60° C to 150° C in the presence of a water soluble persulfate initiator, and an effective amount of an emulsifier selected from nonionic and anionic emulsifiers and mixtures thereof, wherein said vinyl halide monomer is present in an

amount equal to about 0.1 to about 20% by weight based on said aqueous reaction medium and wherein said alkyl vinyl monomer is present in an amount equal to about 0.1 to 10% by weight based on said aqueous reaction medium, to form said emulsion.

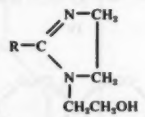
3,998,775

AEROSOL LATEX PAINT CONTAINING IMIDAZOLINE SURFACTANTS

Bernard Taub, Williamsville, N.Y., assignor to Allied Chemical Corporation, N.J.

Filed Apr. 24, 1975, Ser. No. 571,166
Int. Cl.² C08L *31/00*
U.S. Cl. 260—29.6 MN **8 Claims**

1. An aerosol latex paint composition comprising an emulsion of a water-insoluble vinyl acetate-acrylic copolymer resin in a liquid propellant containing an imidazoline surfactant, wherein the liquid propellant comprises 30 to 70 weight percent of the composition and is a hydrocarbon having 3 to 4 carbon atoms, a halogenated hydrocarbon having 1 to 4 carbon atoms, or mixtures thereof, and wherein the imidazoline surfactant has the formula:



wherein R is a straight chain alkyl, or a straight or branched chain alkyl or aralkyl, containing 7 to 24 carbon atoms, said R can contain up to two oxygen atoms as ether or ester linkages.

3,998,776

ISOTHIOURONIUM STABILIZED LATEXES

Earl H. Wagener, Concord, Calif.; Ritchie A. Wessling, and Dale S. Gibbs, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 392,700, Aug. 29, 1973, Pat. No. 3,882,009. This application Apr. 10, 1975, Ser. No. 566,865
Int. Cl.² C08L *31/00*
U.S. Cl. 260—20.6 SQ **11 Claims**

1. A latex of a water-insoluble organic polymer which is electrically non-conductive when in a dry state having particles which are stabilized in aqueous dispersion by cationic groups of which a substantial portion are isothiouronium groups having nitrogen atoms with covalent bonds only to carbon atoms; said latex having a pH in the range of from about 2 to about 12 and having a particle size of from about 500 Angstroms to about 10,000 Angstroms.

3,998,777

METHOD OF HYDROLYZING POLYACRYLAMIDE

Lawrence J. Connelly, Oak Lawn, and E. G. Ballweber, Glenwood, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Oct. 15, 1974, Ser. No. 514,961
Int. Cl.² C08L *33/26*
U.S. Cl. 260—29.6 E **16 Claims**

1. A method of hydrolyzing polyacrylamide which comprises the steps of:

A. forming a polymeric latex comprising a water-in-oil emulsion which contains dispersed therein finely divided polyacrylamide, said water-in-oil emulsion of polyacrylamide containing from 10 to 40% by weight of oil, 20 to 50% by weight of water, 20 to 40% by weight of polyacrylamide and 0.1 to 30% by weight of a water-in-oil emulsifying agent based on the weight of oil;

B. adding to said polymeric latex from 0.10 to 15% by weight based on the polymeric latex of an alkali stable organic surfactant capable of forming a water-in-oil emulsion; and

C. reacting said polymeric latex containing the organic stabilizer with an hydrolysis agent selected from the group consisting of alkali metal hydroxides and quaternary ammonium hydroxides, to form a stable water-in-oil emulsion of finely divided hydrolyzed polyacrylamide.

3,998,778

POURABLE ELASTOMERIC PARTICLES

Gerhard Berg; Karl-Heinz Nordsiek; Gunter Maahs, and Wilhelm Schlänzer, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Division of Ser. No. 270,003, July 10, 1972, Pat. No. 3,846,365. This application Nov. 4, 1974, Ser. No. 520,658
Claims priority, application Germany, July 15, 1971, 2135266
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² C08K *3/04, 3/36, 5/01*
U.S. Cl. 260—33.6 AQ **12 Claims**

1. A composition of matter capable of being compounded and sulfur cured to form a rubbery vulcanizate, said composition comprising discrete, finely divided, tack-free, pourable, filler-containing elastomer particles having an average diameter of 1-500 microns and containing a solid, finely divided elastomer filler uniformly dispersed therein, said composition when compounded and sulfur cured forming a vulcanizate exhibiting increased tensile strength as compared to an otherwise identical vulcanizate prepared by mechanically mixing the elastomer and filler, and being prepared by:

gradually introducing an admixture of (*a*) an aqueous emulsion of 1-50 percent by weight of an elastomer selected from the group consisting of polybutadienes having a 1,2-content of 15–75 percent, polyalkenamers, solution polymerized styrenebutadiene copolymers, ethylene-propylene copolymers and ethylenepropylene-diene copolymers, said aqueous emulsion consisting essentially of (i) a solution of said elastomer dissolved in a volatile, inert organic solvent having a boiling point below 100° C, (ii) an elastomer emulsifying amount of a quaternary ammonium salt cationic surfactant and (iii) water, the volume ratio of the aqueous phase to the organic solvent phase of said emulsion being from about 0.25:1 to about 2.5:1 respectively, and (*b*) an aqueous suspension or dispersion of a solid, finely divided elastomer filler, the volume ratio of aqueous filler to said aqueous emulsion in said admixture being from about 0.2:1 to about 2.0:1, into a 0.1 to 5 fold volume of an aqueous alkali silicate solution containing 2–20 moles of SiO_2 per mole of said quaternary ammonium salt while maintaining said silicate solution at a pH greater than 2 to avoid a condensation reaction of the silicate anions, and

simultaneously evaporating said volatile organic solvent to form said filler-containing elastomer particles.

3,998,779

COATING METHOD AND COMPOSITION FOR THE SACRIFICIAL PROTECTION OF METAL SUBSTRATES

Robert B. Baer, San Antonio, Tex., assignor to Chromalloy American Corporation, New York, N.Y.

Division of Ser. No. 362,062, May 21, 1973, Pat. No. 3,887,449. This application Feb. 13, 1975, Ser. No. 549,775
Int. Cl.² C08K *3/08*
U.S. Cl. 260—37 EP **3 Claims**

1. A composite sacrificial coating material for protecting a metal substrate against corrosion which comprises a bondable curable non-metallic adhesive material having uniformly dispersed therethrough from about 10% to 50% by weight of a powdered alloy composition, said alloy composition ranging by weight from about 5% to 60% of a metal selected from the

group consisting of strontium, barium and calcium, 0% to about 20% aluminum and the balance substantially magnesium ranging from about 40% to 95%, said coating material being electrically conductive relative to the metal substrate.

3,998,780

BIS-(POLYHALOGENOANILINO)-ANTHRAQUINONES

Arnold Wick, Therwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

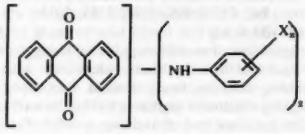
Division of Ser. No. 461,567, April 17, 1974, Pat. No. 3,927,043. This application Oct. 28, 1975, Ser. No. 626,394

Claims priority, application Switzerland, Apr. 19, 1973, 5756/73

Int. Cl.² C10M *1/24, 3/18, 5/14, 7/20*

U.S. Cl. 260—37 NP **7 Claims**

1. Process for the bulk dyeing of high molecular organic compounds, characterised in that bis-(halogenophenylamino)anthraquinones of the formula



wherein X denotes a halogen atom and n denotes a number from 2 to 5, are used as the dyestuff.

3,998,781

POLYOLEFIN COMPCSITION AND METHOD FOR MINIMIZING MIGRATION OF U.V. ABSORBER THEREIN

Fritz Lammert Kliphuis, Holland, Mich., assignor to Chemetron Corporation, Chicago, Ill.

Filed Apr. 14, 1975, Ser. No. 567,825

Int. Cl.² C08K *3/36*

U.S. Cl. 260—42.45 **10 Claims**

1. A method of making a polyolefin composition having a high concentration of an ultraviolet light absorber dispersed therein which comprises mixing a resinous polyolefin, with from about 10% to about 60% by weight of the composition, of an ultraviolet light absorber, which tends to exude from the polyolefin composition and a stabilizing amount of an amorphous, micro-sized silica.

3,998,782

STABILIZER COMPOSITION FOR POLYVINYL CHLORIDE POLYMERS

Ronald Eric Hutton, Southport; Brian Rodney Iles, Liverpool, and Vincent Oakes, Eccleston, all of England, assignors to Akzo N.V., Arnhem, Netherlands

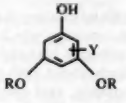
Filed July 31, 1975, Ser. No. 600,592

Claims priority, application Netherlands, Aug. 1, 1974, 7410327

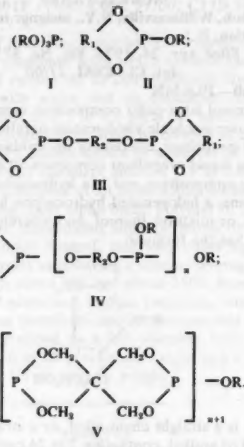
Int. Cl.² C08K *5/52, 5/53*

U.S. Cl. 260—45.8 R **8 Claims**

1. A low toxicity stabilizer composition adapted to counteract the deteriorative effect of heat on vinyl chloride based polymers comprising a synergistic mixture of: a first stabilizer (a) having the formula:



where Y is hydrogen atom or an acyl group selected from the group consisting of benzoyl and alkane carbonyl containing 2 to 18 carbon atoms, and R is selected from the group consisting of hydrogen and the following organic radicals having from one to eighteen carbon atoms: an alkyl group, a cyclohexyl group, or an aralkyl group; a second stabilizer (b) which is an organophosphite which is defined by one of the following formulae:



6. A stabilized composition of a vinyl chloride based polymer and the stabilizer composition of claim 1, the stabilizer composition being present in an amount of 0.01 to 10 percent by weight of the total polymer formulation.

3,998,783

FLAME RETARDANT POLYMER COMPOSITIONS

William Paul Whelan, Jr., Woodbury, Conn., assignor to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 396,632, Sept. 12, 1973, Pat. No. 3,956,139. This application Dec. 11, 1975, Ser. No. 639,942

Int. Cl.³ C08K *5/59, 5/53, 5/42, 3/30*

U.S. Cl. 260—45.75 A **7 Claims**

1. A composition comprising an organic polymer selected from the group consisting of hydrocarbon polymers, nitrile-containing polymers, carboxylic-containing polymers and carboxylate ester-containing polymers and an effective flame retardant amount of: (a) a compound selected from the group consisting of the oxides, sulfates, carbonates, acetylacetonates, and carboxylates of iron, cobalt, nickel, tin and antimony and the bis-cyclopentadienyl compounds of iron, cobalt and nickel, said carboxylates being the salts of an acid selected from the group consisting of acetic, oxalic, tartaric and citric acids; and (b) an alkali metal halide selected from the group consisting of chlorides, bromides and iodides; and (c) from about 25% by weight to about 325% by weight, based on chemical equivalency to the sum of the amounts of compound (a) and halide (b), of a compound selected from the group consisting of succinic, glutaric, adipic, pimelic, suberic, tartaric, m-phthalic and citric acids, mono- and dialkyl phosphonic and phosphoric acids, organic sulfonic acids having an acid ionization constant in excess of 10^{-6} and which is substantially non-volatile at conventional polymer processing temperatures, and potassium bisulfate, except that the amount of component (c) is based only on equivalency with the amount of halide (b) in the case in which compound (a) is a salt of an acid having the same ionization constant as or a higher ionization constant than that of component (c); compound (a) being present in an amount which is about 5 to

about 100% by weight of the amount chemically equivalent to the halogen atoms present.

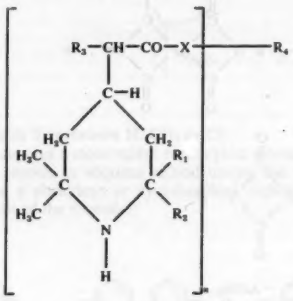
3,998,784
COMPOSITIONS STABILIZED WITH PIPERIDINE DERIVATIVES

Barry Cook, Manchester, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 380,043, July 17, 1973, Pat. No. 3,929,804. This application Oct. 20, 1975, Ser. No. 623,835
Claims priority, application United Kingdom, July 28, 1972, 35488/72
Int. Cl.² C08K *5/34, 5/36*
U.S. Cl. 260—45.75 N **13 Claims**

1. A composition of matter stabilized against ultraviolet and heat deterioration which comprises a synthetic organic polymer normally subject to deterioration containing from 0.1% to 2% by weight of the polymer of a stabilizing compound of the formula

I



wherein

R_1 to R_2 are the same or different and each is a straight or branched alkyl residue having from 1 to 12 carbon atoms or R_1 and R_2, together with the carbon atom to which they are attached, form a cycloalkyl group having from 5 to 12 carbon atoms,

R_3 is hydrogen, a straight-or branched alkyl residue having from 1 to 4 carbon atoms, an aralkyl residue having from 7 to 9 carbon atoms, or a cycloalkyl group having 5 or 6 carbon atoms,

R_4 is an ion of a metal of Group 8 of the Periodic System of Elements or a hydrocarbyl residue having from 2 to 20 carbon atoms and being either unsubstituted or substituted by halogen or interrupted by one or more oxygen or sulphur atoms,

X is —O—, —S— or $>NR_5$ wherein R_5 has the same significance as R_3 and

n is 2, 3 or 4.

3,998,785
ANTI-FUNGAL AND/OR ANTI-BACTERIAL HARDWARE FOR INK PRINTING APPARATUS

Jerry F. Stone, Georgetown, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 478,986, June 12, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,791
Int. Cl.² C08K *5/47, 5/34, 5/39*
U.S. Cl. 260—45.75 W **6 Claims**

1. An ink system comprising:

a liquid ink incorporating an organic solvent; an ink containing element exhibiting anti-fungal characteristics, said ink containing element comprising:

a thermoplastic resin material initially in pellet form exhibiting resistance to said organic solvent;

a fungicide exhibiting the characteristics of an effective anti-microbial agent, insolubility in water, low solubility in said organic solvent, thermal stability for molding with said thermoplastic, and extended storage life;

said fungicide being thoroughly mixed as fungicide powder in with the pellets of resin prior to molding into said ink containing element;

said fungicide slowly leaching from the ink containing element upon contact therewith to provide a continuing fungicide to the ink system.

3. The system of claim 1, wherein:

said thermoplastic material comprises a polyester that is about 99.0% of said element; and wherein

said fungicide comprises manganous ethylenebis dithiocarbamate that is about 1.0% of said element.

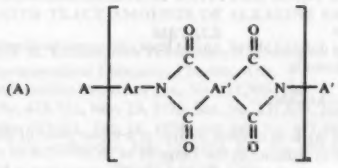
3,998,786
PROCESS FOR PREPARING AROMATIC POLYIMIDES, POLYIMIDES PREPARED THEREBY

Gaetano Francis D'Alelio, South Bend, Ind., assignor to University of Notre Dame du Lac, Notre Dame, Ind.

Filed May 25, 1973, Ser. No. 363,800
Int. Cl.² C08G *73/10, 73/12*
U.S. Cl. 260—47 CP **22 Claims**

1. A process for the preparation of a substantially cyclized polyimide of the formula:

(A)

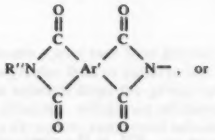


wherein

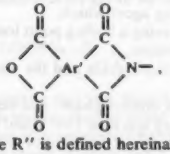
A*r* is a divalent aromatic oganic radical,

A*r'* is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the A*r'* radical,

A is NH_2—,

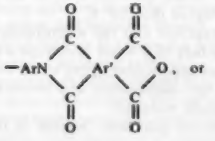


, or



,

where R'' is defined hereinafter, A' is —R'', —ArNH_2,



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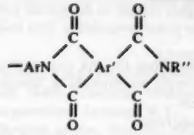
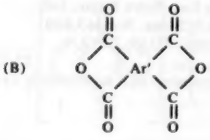


where R'' is defined hereinafter, and

n is 0 or a positive integer of at least one, soluble in a phenol which comprises:

1. reacting a reaction mixture of at least one tetracarboxylic acid dianhydride of the formula:



(B)

wherein

Ar' is as defined above, and at least one aromatic diamine o the formula:

$$H_2N-Ar-NH_2 \qquad (C)$$

wherein Ar is as defined above, at a molar ratio of dianhydride to diamine in the range of m to $m+1$:m to $m+1$ where m is a positive integer of at least one and as high as n in formula (A), with the proviso that when the ratio of dianhydride to diamine is $m+1$:m, the reaction mixture contains 0 or 2 moles of a monoamine of the formula $R''NH_2$ wherein R'' is a hydrocarbon radical of 1 to 12 carbon atoms which is saturated, has olefinic unsaturation or acetylenic unsaturation, and —CN, —CHO or —CH=NR'' substituted derivatives thereof,

where each R' is hydrogen or $-CH_3$ in the presence of at least one organic azeotroping agent which:

a. gives a water azeotrope having a boiling point less than 95° C at atmospheric pressure,

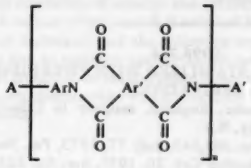
b. is non-reactive with the dianhydride and the diamine, and

c. separates from water as a distinct phase, said reaction conducted at a temperature less than 140° C and below the boiling point of said phenol and higher than the boiling point of said azeotroping agent with the vapor phase temperature being between that of the water azeotrope and no higher than 95° C

2. removing water of reaction and the azeotroping agent from the reaction mixture as a water azeotrope and

3. returning quantities of azeotroping agent to the reaction mixture to maintain the temperature and reaction mixture volume substantially constant.

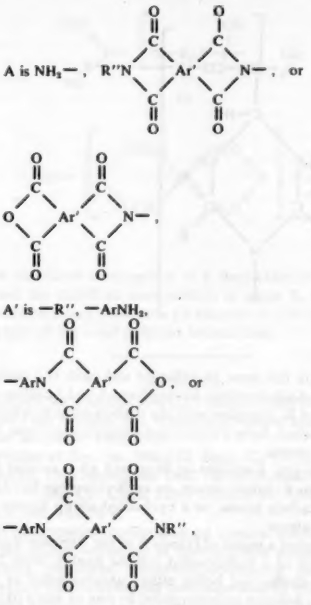
21. A substantially cyclized polyimide soluble in phenols having the formula:



wherein

Ar is a divalent aromatic organic radical,

Ar' is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in the Ar' radical,



R'' is a hydrocarbon radical of 1 to 12 carbon atoms which is saturated, has olefinic unsaturation and —OH, —CN, —CHO or —CH=NR'' substituted derivatives thereof, and

n has a numerical value of 4 to 100.

3,998,787

HEAT-STABLE POLYIMIDE RESINS FROM BIS-IMIDE AND ALDEHYDE-AZINE

Michel Bargain, 74 Rue des Aqueducs, Lyon 5e, France

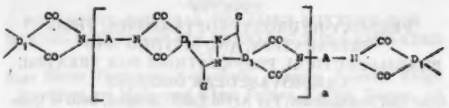
Filed Feb. 22, 1972, Ser. No. 228,233

Claims priority, application France, Feb. 24, 1971, 71.06288

Int. Cl.[2] C08L 69/26

U.S. Cl. 260—47 CZ **11 Claims**

1. A heat-stable cured thermoset resin which consists essentially of three-dimensional recurring units of the general formula:



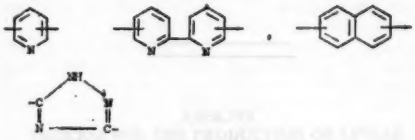
in which, in any particular recurring unit *a* is zero or an interger from 1 to 5;

denotes a radical of the general formula:

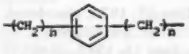
in which Y represents H, CH_3 or Cl;

G denotes a monovalent carbocyclic aromatic radical; and

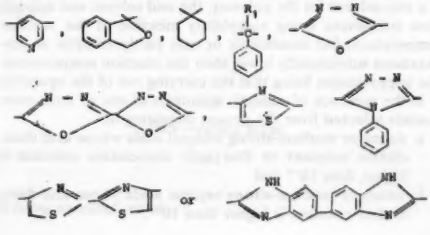
A denotes an alkylene radical having less than 13 carbon atoms, a phenylene or cyclohexylene radical or one of the radicals of the formulae:



or



wherein *n* represents an integer from 1 to 3, or a divalent radical having 12 to 30 carbon atoms consisting of phenylene or cyclohexylene radicals linked to one another by a simple valency bond or by —O— or —S—, an alkylene group with 1 to 3 carbon atoms, —CO—, —SO_2—, —NR_1—, —N = N—, —CONH—, —COO—, —P⅛O¼R_1—, —CONH—X—NHCO—,



wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms, a phenyl radical or a cyclohexyl radical and X represents an alkylene radical with less than 13 carbon atoms, such that there are, on average, at least 4.4 and at most about 20

radicals per

radical.

3,998,788

ALUMINUM-ZIRCONIUM ANTI-PERSPIRANT SYSTEMS WITH TRACE AMOUNTS OF ALKALINE EARTH METALS

Andrew M. Rubino, New Providence, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Continuation-in-part of Ser. No. 411,995, Nov. 1, 1973, and Ser. No. 418.712, Nov. 23, 1973, Ser. No. 431,639, Jan. 8, 1974, Ser. No. 433,931, Jan. 16, 1974, and Ser. No. 477,544, June 7, 1974. This application July 17, 1974, Ser. No. 489,320.

Int. Cl.² A61K 7/32

U.S. Cl. 424—47 **18 Claims**

1. A water soluble, astringent complex formed by reacting the following components (a), (b) and (c) in aqueous medium:

a. a basic aluminum compound selected from the group having the general empirical formula:

$$Al_2(OH)_{6-nx}A_x$$

wherein *x* may vary from greater than 0 to less than 6, 6-*nx* is greater than or equal to 0, *n* is the valence of A, and A is selected from the group consisting of halide, nitrate, sulfamate, sulfate and mixtures thereof;

b. a zirconium compound selected from trioxodizirconium salts and the group having the general empirical formula:

$$ZrO(OH)_{2-nz}B_z$$

wherein *z* may vary from 0.9 to 2, *n* is the valence of B, 2-*nz* is greater than or equal to 0, and B is selected from the group consisting of halide, nitrate, sulfamate, sulfate and mixtures thereof; and

c. a salt of an alkaline earth metal, the cation of said salt being selected from the group consisting of magnesium, calcium and mixtures thereof, and the anion of said salt being such as to produce a highly ionized alkaline earth metal in an acidic solution,

said compounds being present in such amounts as to yield an Al/Zr mole radio of about 10:1 to 1:10, and said alkaline earth metal salt being present in such amounts that the weight ratio of alkaline earth metal to aluminum plus zirconium is about 1:1000 to 1:30.

3,998,789

FLAME RESISTANT THERMOSETTING RESIN COMPOSITION AND METHOD FOR PREPARING SAME

Akira Yoshioka, Yokohama, Japan, assignor to Sumitomo Bakelite Company, Limited, Tokyo, Japan

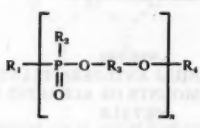
Filed Sept. 9, 1974, Ser. No. 504,175

Claims priority, application Japan, Sept. 11, 1973, 48-101673; Sept. 11, 1973, 48-101674; Jan. 14, 1974, 49-6653; Feb. 20, 1974, 49-19515; Feb. 20, 1974, 49-19516

Int. Cl.² C08K 5/52, 5/53; C08G 79/04

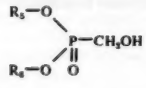
U.S. Cl. 260—47 P 33 Claims

1. A flame resistant thermosetting resin molding, laminating electrical insulatory or adhesive composition comprising a reaction product of a thermosetting resin selected from the group consisting of phenolic resins, epoxy resins, these resins modified with one another, and these resins modified with amino resins at and least one compound selected from the group consisting of phosphorus compounds represented by the general formula,



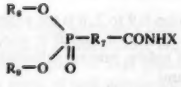
(I)

wherein R_1 and R_2, which may be the same or different, represent each an alkyl, aryl, alkoxy, or aryloxy group, which has up to 10 carbon atoms and may have one or more hydroxyl substituents; R_3 represents an aromatic ring; R_4 represents a hydrogen atom or an alkyl or aryl group, both groups having up to 10 carbon atoms; and n is an integer from 2 to 30 phosphorus compounds represented by the general formula,



(II)

wherein R_5 and R_6, which may be the same or different, represent each an alkyl, alkenyl, or aryl group, which has up to 20 carbon atoms and may have one or more halogen atoms, and phosphorus compounds represented by the general formula,



(III)

wherein R_8 and R_9, which may be the same or different, represent each an alkyl, alkenyl or aryl group, which has up to 20 carbon atoms and may have one or more halogen substituents, R_7 represents an alkylene, alkenylene or arylene group, which has up to 10 carbon atoms and may have one or more halogen substituents and X represents a hydrogen atom or hydroxymethyl group, the ratio of the phosphorus compound to the thermosetting resin being in the range of 0.7 to 6% by weight in terms of phosphorus atom content of the total resin.

3,998,790

PHENOXY-HYDROXYPROPYLAMINES, THEIR PREPARATION, AND METHOD AND PHARMACEUTICAL PREPARATIONS FOR TREATING CARDIOVASCULAR DISEASES

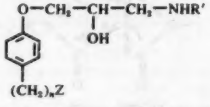
Arne Elof Brändström; Per Arvid Emil Carlsson, both of Goteborg; Stig Ake Ingemar Carlsson, Molnlycke; Hans Rudolf Corrodi, Sodertalje; Lars Ek, Onsala, and Bengt Arne Hjalmar Ablad, Goteborg, all of Sweden, assignors to Aktiebolaget Hassle, Goteborg, Sweden

Division of Ser. No. 342,749, March 19, 1973, Pat. No. 3,873,600, and a continuation-in-part of Ser. No. 115,851, Feb. 16, 1971, abandoned. This application Jan. 15, 1974, Ser. No. 433,451

Int. Cl.² C07C 93/06

U.S. Cl. 260—570.7 20 Claims

1. A compound of the formula



and pharmaceutically acceptable, non-toxic acid addition salts thereof, wherein R' is an isopropyl or tertiary butyl radical; Z is a member selected from the group consisting of -OR'', and -SR'', R'' being a straight or branched alkyl radical having 1 to 3 carbon atoms; and n is 1, 2, or 3.

3,998,791

PROCESS FOR THE STABILIZATION OF POLYACETAL REINS

Pierino Radici, Turate (Como); Sergio Custro, Goria Maggiore (Varese), and Paolo Colombo, Saronno (Varese), all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Continuation of Ser. No. 480,068, June 17, 1974, abandoned. This application Aug. 19, 1975, Ser. No. 605,949

Claims priority, application Italy, June 15, 1973, 25408/73

Int. Cl.² C08G 2/34, 2/32

U.S. Cl. 260—67 R 16 Claims

1. In a process for the stabilizatin of polyacetal resins of a molecular weight above 10,000, having terminal hydroxyl groups, which comprises reacting a reagent capable of etherifying the hydroxyl groups with the polyacetal resins suspended in a reaction medium that is liquid under the conditions used, the said reaction medium consisting of at least one substance that is a solvent for the polymer and at least one substance that is a non-solvent for the polymer, the said solvent and non-solvent substances being completely miscible at the reaction temperatures but immisciible or only partly miscible at temperatures substantially lower than the reaction temperatures, the improvement being that the carrying out of the operation is in the presence of catalytic quantities of one or more compounds selected from the groups consisting of

a. strong or medium-strong mineral acids whose acid dissociation constant or first acid dissociation constant is higher than 10^{-7} and

b. strong or medium-strong organic acids whose acid dissociation constant is higher than 10^{-6}.

3,998,792

POLYVINYL BUTYRAL POLYMER MIXTURE FOR MAKING INTERMEDIATE SHEETING FOR LAMINATED GLASS

Hans Dieter Hermann, Neuenhain, Taunus; Joachim Ebigt, Frankfurt am Main, and Klaus Fabian, Kriftel, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 11, 1975, Ser. No. 631,190

Claims priority, application Germany, Nov. 13, 1974, 2453780

Int. Cl.² C08F *16/34, 16/06*

U.S. Cl. 260—73 L 4 Claims

1. A polymer mixture for making intermediate sheeting for laminated glass essentially consisting of polyvinyl butyral, the usual plasticizers and optionally stabilizers and auxiliaries to improve the adhesion wherein the polyvinyl butyral used is a mixture consisting of 70 to 97.5% by weight of a polyvinyl butyral having a viscosity in the range of from 60 to 120 cp in a 5% solution in ethanol at 23° C and from 30 to 2.5% by weight of a polyvinyl butyral having a viscosity in the range of from 2 to 30 cp in a 5% solution in ethanol at 23° C, the ratio M_w/M_n of the weight average to the numerical average of the molecular weight, determined by gel permeation chromatography, of the two polyvinyl butyrals being smaller than 5.

3. A process for the manufacture of polyvinyl butyral mixtures as claimed in claim 1, which comprises acetalizing with n-butyraldehyde in the presence of an acid catalyst a mixture of 70 to 97.5 parts by weight of a polyvinyl alcohol having a viscosity of from 25 to 40 cp in a 4% aqueous solution at 20° C and 30 to 2.5 parts by weight of a polyvinyl alcohol having a viscosity of 3 to 15 cp in a 4% aqueous solution at 20° C, the ratio M_w/M_n of the weight average to the numerical average of the molecular weight of the two polyvinyl alcohol components being smaller than 5.

3,998,793

PROCESS FOR THE PRODUCTION OF LINEAR POLYESTERS

Werner Gey, Offenbach (Main), and Wolfgang R. Langhauser, Bergen-Enkheim, both of Germany, assignors to Zimmer Aktiengesellschaft, Germany

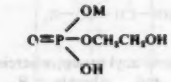
Filed Mar. 6, 1975, Ser. No. 555,787

Claims priority, application Germany, Mar. 14, 1974, 2412216

Int. Cl.² C08G *63/38*

U.S. Cl. 260—75 R 3 Claims

1. Process for the production of linear polyesters by ester interchange of a dialkyl ester of terephthalic acid with a glycol under ester-interchange conditions in the presence of a salt of a divalent metal acting as ester-interchange catalyst and by subsequent polycondensation, in which there is added to the reaction mixture in a quantity of from 1 to 15 times the stochiometric amount required to react with the amount of said catalyst present in the reaction mixture as catalyst inactivator, after reaching an ester-interchange degree of at least 90%, a hydrogen monoglycolphosphate compound of the general formula



M being an alkali metal

3,998,794

POLYURETHANE POLYUREAS WHICH CONTAIN URETDIONE GROUPS

Hans Jürgen Müller, Cologne, and Kuno Wagner, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 350,676, April 12, 1973, abandoned. This application June 19, 1975, Ser. No. 588,267

Claims priority, application Germany, Apr. 29, 1972, 2221170

Int. Cl.² C08G *18/12, 18/79, 18/28*

U.S. Cl. 260—77.5 AM 11 Claims

1. A process for the production of solutions of cross-linkable polyurethane-polyureas containing uretdione groups comprising chain-extending:

a. polyisocyanates which contain aliphatically bound uretdione and isocyanate groups, with

b. primary and/or secondary diamines whose amino groups are

bound to cycloaliphatically bound carbon atoms at a temperature of −50° to 120° C without substantial opening of said uretdione rings.

3,998,795

(ACYL-D-α-AMINO ACID-GLY-GLY-TYR-ALA)¹-SOMATOSTATIN

Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,217

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—78 A 10 Claims

7. An octadecapeptide of the formula R-D-Y-Gly-Gly-Tyr-(R^1)-Ala-Gly-Cys(R^2)-Lys(R^3)-Asn-Phe-Phe-Trp-Lys(R^4)-Thr (R^5)-Phe-Thr (R^6)-Ser (R^7)-Cys (R^8)-O-X in which R is a member selected from the group consisting of hydrogen, alkanoyl of 2 to 18 carbon atoms, benzoyl, and an α-amino protecting group;

R^1 is a protecting group for the phenolic hydroxyl group of the tyrosyl moiety selected from the group consisting of benzyl, 2,6-dichlorobenzyl, benzyloxycarbonyl and 2-bromobenzyloxycarbonyl;

R^2 and R^8 are protecting groups for the sulfhydryl group of the two cysteinyl moiety independently selected from the group consisting of benzyl; methyl, methoxy or nitro-benzyl; trityl, benzyloxycarbonyl, benzhydryl, tetrahydropyranyl, carboxymethyl, acetamidomethyl, benzoyl, benzylthiomethyl, ethylcarbamyl, thioethyl, p-methoxybenzyloxycarbonyl, and the sulfonate salt;

R^3 and R^4 are members independently selected from the group consisting of hydrogen and a protecting group for the epsilon amino group of the two lysyl moieties selected from benzyloxycarbonyl; halo- or nitro-benzyloxycarbonyl; tosyl, diisopropylmethoxycarbonyl, t-amyloxy-carbonyl and t-butyloxycarbonyl;

R^5, R^6 and R^7 are selected from the group consisting of hydrogen and a protecting group for the hydroxyl group of the threonyl and seryl moieties, independently selected from acetyl, benzoyl, tert-butyl, trityl, benzyl, 2,6-dichlorobenzyl, and benzyloxycarbonyl;

X is a member selected from the group consisting of hydroxy, methoxy and -O-CH_2-[polystyrene resin support], wherein said polystyrene resin is cross linked with from 0.5 to about 3 percent divinylbenzene; and

Y is an α-amino acid of the D-series.

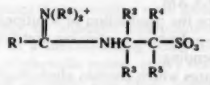
3,998,796

NITROGEN AND SULFUR-CONTAINING AMPHOTERIC COMPOUNDS AND POLYMERS THEREOF

Charles Kendall Steinhardt, Houston, Tex., assignor to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 291,424, Sept. 22, 1972, abandoned. This application July 7, 1975, Ser. No. 593,602
Int. Cl.² C07C *143/16*; C08G *75/00*, *75/20*
U.S. Cl. 260—79.7 13 Claims

1. A compound of the formula



wherein each of R^1, R^2, R^3, R^4 and R^5 is hydrogen or a hydrocarbon-based radical and each R^6 is individually hydrogen or a hydrocarbon-based radical, or $N(R^6)_2$ is a five- or six-membered heterocyclic ring in which all atoms in the $(R^6)_2$ moieties are carbon or at most one such atom is oxygen, sulfur or nitrogen; said hydrocarbon-based radicals having a carbon atom directly attached to the remainder of the molecule and having predominantly hydrocarbon character.

7. An addition polymer of a compound according to claim 6.

3,998,797

POSTTREATMENT OF COPOLYMER OF STYRENE AND ACRYLONITRILE

Jacqueline Brandli, Brussels, and William J. I. Bracke, Hamme, both of Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed Feb. 27, 1975, Ser. No. 553,610
Claims priority, application Belgium, Oct. 24, 1974, 149845
Int. Cl.² C08F *220/44*
U.S. Cl. 528—487 2 Claims

1. A process for producing a copolymer of styrene and acrylonitrile substantially free of acrylonitrile which comprises copolymerizing styrene and acrylonitrile and treating the resulting copolymer at a temperature of between 100 and 110° C with an aqueous solution of a sulphur compound selected from the group consisting of alkaline sulfides and alkaline disulfides, the amount of said sulphur compound used being such as to correspond to 25 to 100% of the stoechiometric amount required to react with the residual acrylonitrile in said copolymer.

3,998,798

MONELLIN, A SWEET POLYPEPTIDE DERIVED FROM FRUIT OF DIOSCOREOPHYLLUM CUMMINSII

Robert H. Cagan, Bryn Mawr; Morley R. Kare, Narberth, and James A. Morris, Broomall, all of Pa., assignors to The Trustees of the University of Pennsylvania, Philadelphia, Pa.

Continuation of Ser. No. 317,662, Dec. 22, 1972, abandoned. This application Sept. 5, 1975, Ser. No. 610,677
Int. Cl.² A23J *1/00*; A23L *1/236*; A23J *1/14*
U.S. Cl. 260—112 R 1 Claim

1. A sweet substance consisting essentially of the essentially pure, intensely sweet principle of the fruit *Dioscoreophyllum cumminsii* (Diels) extracted from the crude fresh fruit of *Dioscoreophyllum cumminsii*, substantially free from carbohydrate, which is a single homogeneous protein having intensely sweet taste characterized by: MW, 10,700; isoelectric point, 9.3; u.v. absorption maximum ($\lambda max = 277$ nm); extinction coefficient at pH 7.2, $1.47 \times 10^4 M^{-1}cm^{-1}$ (λmax — 277 nm); extinction coefficient at pH 12.8, $1.83 \times 10^4 M^{-1}cm^{-1}$ (λmax =290 nm); infrared absorption spectrum (KBr pellet) expressed in reciprocal centimeters: 3355 (broad), 3290, 2970, 1658, 1640, 1532 (broad), 1243; molecular formula: $C_{486}H_{755}N_{131}O_{139}S_2$; elemental analysis: C, 45.68; H, 6.22; N, 14.13; S, 1.32; O (by difference), 32.65; having a circular dichroism and having the approximate integral amino acid residues per mol as follows

Amino Acid	Integral No. of Residues/Mole
Tryptohan	1
Lysine	8
Histidine	0
Arginine	7
Aspartic Acid (+ Asparagine)	10
Threonine	4
Serine	2
Glutamic Acid (+ Glutamine)	12
Prline	6
Glycine	8
Alanine	3
Cysteine	1
Cystine	0
Valine	4
Methionine	1
Isoleucine	6
Leucine	6
Tyrosine	7
Phenylalanine	5

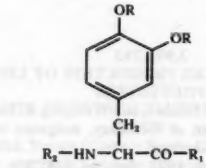
3,998,799

NOVEL, TRANSIENT PRO-DRUG FORMS OF L-DOPA

Nicolae S. Bodor; Kenneth B. Sloan, both of Lawrence, Kans., and Anwar A. Hussain, Lexington, Ky., assignors to Interx Research Corporation, Lawrence, Kans.

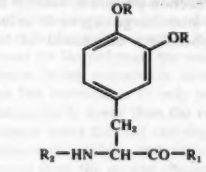
Continuation-in-part of Ser. No. 412,419, Nov. 2, 1973, Pat. No. 3,891,696. This application Apr. 17, 1975, Ser. No. 569,009
Int. Cl.² C07C *103/52*; A61K *37/00*
U.S. Cl. 260—112.5 R 49 Claims

1. A pro-drug compound of the formula:



(I)

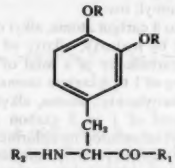
wherein R represents a hydrogen atom, an acyl group and a -CO-R_3 group, wherein R_3represents the residue of any N,N-C_1-C_2 dialkylamino acid or a C_4-C_6 cycloalkylamino acid; wherein R_1 represents a member selected from the group consisting of a hydroxyl group and a -OM group, wherein M is a member selected from the group consisting of an alkali metal and an ammonium ion; and wherein R_2 represents a -CO-R_3 group, wherein R_3 represents the residue of any N,N-(C_1-C_2)-dialkylamino acid or a C_4-C_6-cycloalkylamino acid;



(II)

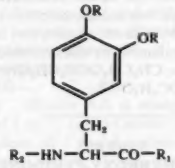
wherein R represents an acyl group; wherein R_2 represents a hydrogen atom; and wherein R_1 represents a -NHCH(R_4)COOR$_5$ group, wherein R_4 represents the residue of any naturally occurring protein amino acid, and wherein R_5

represents a member selected from the group consisting of a hydrogen atom, a C_1-C_5 alkyl group, and a C_1-C_5 alkylaryl group, and the HX salts thereof, wherein X is a conventional pharmaceutically acceptable acid addition salt anion;



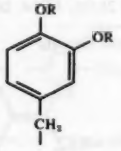
(III)

wherein R represents an acyl group; wherein R_1 represents a member selected from the group consisting of a hydroxyl group, a $-OCH_3$ group, a $-OC_3H_5$ group, a $-OC_3H_7$ group, a $-OC_4H_9$ group, and a $-OCH_2C_6H_5$ group; and wherein R_2 represents an $NH_2CH(R_6)CO-$ group, wherein R_6 represents the residue of any naturally occurring protein amino acid, and the HX salts thereof, wherein X is defined as above;

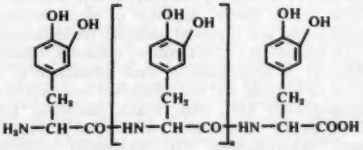


(IV)

wherein R represents an acyl group; wherein R_1 represents a member selected from the group consisting of a hydroxyl group, a $-OCH_3$ group, a $-OC_3H_5$ group, a $-OC_3H_7$ group, a $-OC_4H_9$ group, and a $-OCH_2-C_6H_5$ group; and wherein R_2 represents an $NH_2-CH(R_7)-CO-$ group, wherein R_7 represents the residue of a 3,4-diacylphenylalanine group having the formula:



wherein R is defined as above, and the HX salts thereof, wherein X is as defined above; and



(V-A)

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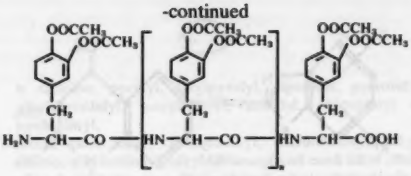


(V-B)

wherein *n* represents an integer of from 2 to 50 with respect to formula (V-A), and wherein *n* represents an integer of from 1 to 50 with respect to formula (V-B).

3,998,800

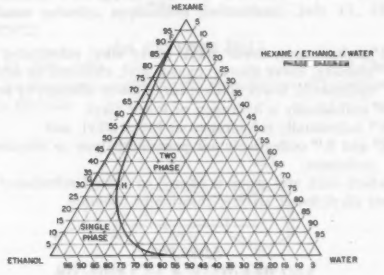
DEFLAVORING OLEAGINOUS SEED PROTEIN MATERIALS

Rudolph William Youngquist, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 428,478, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 302,172, Oct. 30, 1972, abandoned. This application Dec. 10, 1974, Ser. No. 531,262

Int. Cl.² A23J *1/14*

U.S. Cl. 260—123.5 **9 Claims**



1. A process for deflavoring defatted soybean protein material which comprises the steps of:

a. contacting defatted soybean protein material having from about 0 to about 16% moisture content by weight with a three-component, single phase solvent which comprises a mixture of from about 30 to about 90 wt.% of a non-polar linear, branched or cyclic saturated hydrocarbon having from 5 to about 12 carbon atoms and an atmospheric boiling temperature below about 200° C, from about 10 to about 69.9 wt.% of an alcohol having from 1 to about 12 carbon atoms, and from about 0.1 to about 10 wt.% water at a temperature of from about 30° C to the boiling temperature of the solvent system; and

b. desolventizing to obtain a proteinaceous soybean product of enhanced blandness.

3,998,801

BENZOTHIAZOLYL-AZO-TETRAHYDROQUINOLINE COMPOUNDS

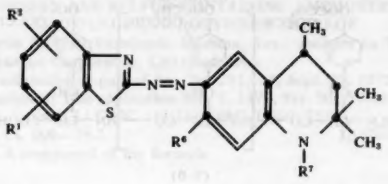
Max A. Weaver, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 201,186, Nov. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 167,041, July 28, 1971, Pat. No. 3,816,390. This application Apr. 18, 1974, Ser. No. 462,166

Int. Cl.² C09B *29/36*; D06P *1/08*, *3/24*

U.S. Cl. 260—155 **9 Claims**

1. A compound having the formula



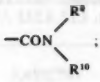
wherein

R^1 is hydrogen; lower alkyl; lower alkyl substituted with carbamoyl, lower alkylsulfonamido, or —NHCO—R^8; lower alkoxy; lower alkoxy substituted with lower alkylsulfonamido, aryl, lower alkoxy or —NHCO—R^8; cyclohexoxy; aryloxy; chlorine; or lower alkanoylamino;

R^2 is hydrogen, lower alkyl, lower alkoxy, chlorine or bromine, or, when R^1 is hydrogen, R^2 is lower alkyl or lower alkoxy;

R^6 is hydrogen, lower alkyl, lower alkoxy or —NHCO—R^8;

R^7 is lower alkyl substituted with lower alkoxy, cyano, aryl, cyclohexyl, ureido, ethylureido, —NHCO—R^8, or



R^8 is hydrogen; lower alkyl; lower alkyl substituted with hydroxy, lower alkoxy, cyano, aryl, chlorine, or aryloxy; cyclohexyl; lower alkoxy; furyl; lower alkenyl; or aryl;

R^9 individually is hydrogen or lower alkyl;

R^{10} individually is hydrogen or lower alkyl; and

R^9 and R^{10} collectively are pentamethylene or ethyleneoxyethylene;

in which each aryl group is phenyl or phenyl substituted with lower alkyl, lower alkoxy, chlorine or bromine.

3,998,802
AZO DYE WITH A 3-CYANO- OR 3-CARBAMOYL-4-METHYL-2,6-DIAMINO-PYRIDINE COUPLING COMPONENT

Johannes Dehnert, and Gunther Lamm, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

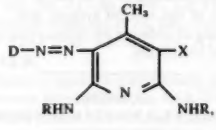
Continuation-in-part of Ser. No. 209,431, Dec. 17, 1971, abandoned. This application Jan. 24, 1974, Ser. No. 435,306

Claims priority, application Germany, Dec. 19, 1970, 2062717; Nov. 15, 1971, 2156545

Int. Cl.[2] **C09B** *29/36, 31/14;* **D06P** *3/24, 3/52*

U.S. Cl. 260—156 **16 Claims**

1. A dye of the formula



where

D is phenyl substituted by chlorine, bromine, methyl, trifluoromethyl, methoxy, nitro, cyano, methylsulfonyl, ethylsulfonyl, phenylsulfonyl, carbalkoxy of a total of 2 to 5 carbon atoms, carbo-β-alkoxyethoxy, said alkoxy having 1 to 4 carbon atoms, or N,N-dialkyl-substituted sulfamoyl, said alkyl having 1 to 3 carbon atoms; phenylazophenyl; phenylazophenyl substituted by chlorine, bromine or nitro; benzthiazolyl; benzthiazolyl substituted by chlorine, methoxy, ethoxy, nitro, cyano, methylsulfonyl or ethylsulfonyl; benzisothiazolyl substituted by chlorine, bromine, cyano or nitro; thiazolyl substituted by cyano or nitro; thienyl substituted by methyl, cyano, nitro, carbalkoxy of a total of 2 to 5 carbon atoms; or thiadiazolyl substituted by phenyl, ethyl, chlorine, bromine, methylmercapto, ethylmercapto or alkoxycarbonylethylmercapto, said alkoxy having 1 to 4 carbon atoms;

X is cyano or carbamoyl; one

R is allyl; alkyl of 1 to 8 carbon atoms; alkyl of 2 to 6 carbon atoms substituted by hydroxy, alkoxy of 1 to 8 carbon atoms, carboxy, carbalkoxy of a total of 2 to 5 carbon atoms, alkanoyloxy of 1 to 4 carbon atoms, acetoacetoxy, phenoxyacetyl, phenylacetyl, amino, alkylamino or dialkylamino of a total of 1 to 8 carbon atoms; benzyl, phenylethyl phenyl substituted by chlorine, methyl, ethyl, β-hydroxyethyl, β-hydroxyethoxy, methoxy or ethoxy; cyclohexyl; hydroxycyclohexyl; ω-N-pyrrolidonylalkyl, said alkyl having 2 or 3 carbon atoms; $CH_2CH_2OCH_2CH_2OH$; $(CH_2)_3O(CH_2)_4OH$; $(CH_2)_3OC_2H_4OCH_3$; $(CH_2)_3OC_2H_4OC_6H_5$; or

and the other R is hydrogen; alkyl of 1 to 8 carbon atoms; alkyl of 2 to 6 carbon atoms substituted by hydroxy, alkoxy of 1 to 8 carbon atoms, carboxy, carbalkoxy of a total of 2 to 5 carbon atoms, alkanoyloxy of 1 to 4 carbon atoms, amino, alkylamino or dialkylamino of a total of 1 to 8 carbon atoms; $CH_2CH_2OCH_2CH_2OH$; $(CH_2)_3O(CH_2)_4OH$; or $(CH_2)_3OC_2H_4OCH_3$.

3,998,803
5-ARYLAZO-6-HYDROXY-PYRIDONE-2 DYES CONTAINING AN AMINO OR SUBSTITUTED AMINO GROUP

Hermann Burkhard, Neu-Allschwil; Roland Entschel, and Willy Steinemann, both of Basel, all of Switzerland, assignors to Fidelity Union Trust Company, Executive Trustee Under the Sandoz Trust, Newark, N.J.

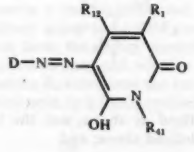
Division of Ser. No. 337,167, March 1, 1973, which is a continuation-in-part of Ser. No. 824,297, May 13, 1969, abandoned. This application June 17, 1974, Ser. No. 480,092

Claims priority, application Switzerland, July 25, 1968, 11195/68; July 13, 1968, 16898/68; July 26, 1968, 17580/68

Int. Cl.[2] **C09B** *29/36, 31/14;* **D06P** *1/08, 3/70*

U.S. Cl. 260—156 **18 Claims**

1. A compound of the formula



wherein

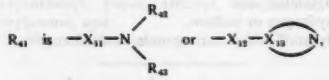
D is carbocyclic aryl, substituted carbocyclic aryl, heterocyclic aryl or substituted heterocyclic aryl, wherein carbocyclic aryl is phenyl, naphthyl or tetrahydronaphthyl, heterocyclic aryl is pyridyl, quinolyl, tetrahydroquinolyl, 1,2,4-triazolonyl, 1,2,4-triazolyl, indazolyl, thiadiazolyl, thiazolyl or benzothiazolyl, each substituent of substituted carbocyclic aryl and substituted heterocyclic aryl is independently halo, nitro, cyano, thiocyano, hydroxy, alkyl, alkoxy, trifluoroalkyl, trichloroalkyl, phenyl, phenoxy, chlorophenoxy, NH_2, alkylamino, dialkylamino, anilino, 2,4-dinitroanilino, alkylcarbonyl, alkoxycarbonyl, alkylcabonylamino, benzamido, alkylbenzoyl, phe-

nylcarbamoyl, sulfamoyl, dialkylsulfamoyl, N-alkyl-N-phenylsulfamoyl, phenylsulfamoyl, phenylazo, diphenylazo or naphthylazo,

R_1 is hydrogen or cyano,

R_{12} is alkyl, phenyl or benzyl, and

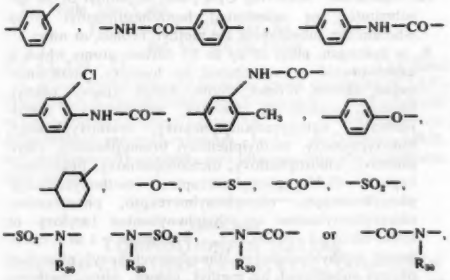
R_{41} is



wherein each of R_{42} and R_{43} is independently hydrogen, alkyl, substituted alkyl, cyclohexyl, alkylcyclohexyl, carbocyclic aryl or substituted carbocyclic aryl, wherein each substituent of substituted alkyl is independently hydroxy, chloro or cyano, each carbocyclic aryl is independently phenyl, naphthyl or tetrahydronaphthyl, and each substituent of each substituted carbocyclic aryl is independently halo, nitro, cyano, thiocyano, hydroxy, alkyl, alkoxy, trifluoroalkyl, trichloroalkyl, phenyl, phenoxy, NH_2, alkylamino, dialkylamino, anilino, alkylsulfonyl, phenylsulfonyl, naphthylsulfonyl, tetrahydronapthylsulfonyl, sulfamoyl, alkylsulfamoyl, dialkylsulfamoyl, phenylsulfamoyl, naphthylsulfamoyl, tetrahydronaphthylsulfamoyl, phenylazo, diphenylazo or naphthylazo, or

R_{42} and R_{43} taken together and with the nitrogen atom to which they are joined are piperidino, pyrrolidino, morpholino, aziridino, piperazino, N′-alkylpiperazino or N′-alkylsulfonylpiperazino,

X_{11} is —Alk—, —Z—Alk—, —Alk—Z— or —Alk′—Z—Alk′, wherein Alk is straight or branched chain alkylene of 1 to 12 carbon atoms or straight or branched chain alkylene of 1 to 12 carbon atoms substituted by halo, hydroxy, cyano, phenyl, dimethylamino or piperidino, each —Alk′— is independently straight or branched chain alkylene or straight or branched chain alkylene substituted by halo, hydroxy, cyano, phenyl, dimethylamino or piperidino with the proviso that the two Alk′ radicals together contain 2 to 12 carbon atoms, and Z is



wherein R_{30} is hydrogen, alkyl, substituted alkyl, cyclohexyl, alkylcyclohexyl, carbocyclic aryl or substituted carbocyclic aryl wherein each substituent of substituted alkyl is independently chloro, hydroxy or cyano, each carbocyclic aryl is independently phenyl, naphthyl or tetrahydronaphthyl, and each substituent of substituted carbocyclic aryl is independently halo, nitro, cyano, thiocyano, hydroxy, alkoxy, alkyl, trifluoroakyl, trichloroalkyl, phenyl, phenoxy, NH_2, alkylamino, dialkylamino, anilino, phenylazo, diphenylazo or naphthylazo,

X_{12} is a direct link or X_{11},

X_{13} is nitrogen or carbon, and

is amidino, pyridyl, alkylpyridyl, piperidyl, pyrrolidyl, alkylpyrrolidyl, morpholinyl, aziridyl, piperazinyl or pyrazolinyl,

wherein each alkyl, trifluoroalkyl, trichloroalkyl, alkylamino, alkylsulfonyl, alkylsulfamoyl and each alkyl chain of each dialkylamino, alkylcarbonyl, alkylcarbonylamino, alkylbenzoyl, dialkylsulfamoyl, N-alkyl-N-phenylsulfamoyl, substituted alkyl, alkylcyclohexyl, N′-alkylpiperazino, N′-alkylsulfonylpiperazino, alkylpyrrolidinyl and alkylpyridyl independently has 1 to 12 carbon atoms, each alkoxy and alkoxy chain of alkoxycarbonyl independently has 1 to 6 carbon atoms, and

each halo is independently fluoro, chloro or bromo.

3,998,804

PROCESS FOR COUPLING OF WATER-INSOLUBLE 2,4-DISUBSTITUTED PHENOLS WITH DIAZOTIZED O-NITROANILINES

Jean Rody, Basel; Alain Claude Rochat, Birsfelden; Hans Jakob Peterli, Fullinsdorf, and Robert Albrecht, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

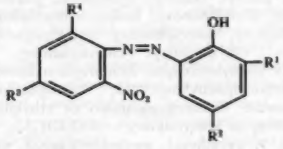
Continuation-in-part of Ser. No. 375,201, June 29, 1973, abandoned. This application May 6, 1975, Ser. No. 575,118

Claims priority, application Switzerland, July 11, 1972, 10357/72

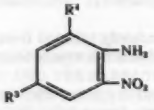
Int. Cl.² C09B 29/12

U.S. Cl. 260—206 **3 Claims**

1. An improved process for the manufacture of a compound of the formula

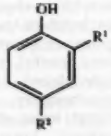


in which R^1 and R^2 independently of one another denote alkyl, cycloalkyl, aralkyl or chlorine, R^3 denotes hydrogen, chlorine, alkyl, alkoxy, alkylsulphonyl, acylamino, $—SO_3H$ or —COOH, and R^4 denotes hydrogen or chlorine, in an aqueous inorganic acid medium at a pH value less than 2 and at a temperature between 0° and 60° C, by the addition of an aqueous acid solution of a diazonium salt of an amine of the formula



(II)

to an aqueous dispersion of a phenol of the formula



(III)

wherein the improvement consists essentially of

using an aqueous dispersion of the water-insoluble phenol of formula III prepared by adding the free phenol with vigorous stirring to an aqueous solution of an effective amount of an alkyl sulfonate, alkylaryl sulfonate, benzene sulfonate or naphthalene sulfonate dispersing agent.

3,998,805

SULPHATOETHYLENE (SULPHONYL OR SULPHONYLAMINO) PHENYLENEAZO DYESTUFFS

Stefan Koller, Ramlinsburg, and Peter Aeschlimann, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

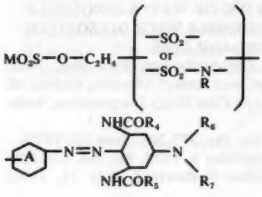
Filed Mar. 28, 1974, Ser. No. 455,779

Claims priority, application Switzerland, Apr. 4, 1973, 4798/73; Mar. 8, 1974, 3290/74

Int. Cl.[2] C09B 29/08, 29/26; D06P 1/06

U.S. Cl. 260—207 9 Claims

1. A dyestuff which corresponds to the formula



where

R_4 and R_5 are independently hydrogen, alkyl of up to 17 carbon atoms which is unsubstituted or substituted by hydroxy, methylmercapto, chloro, bromo, cyano, acetyl, ethoxy, phenyl, benzoyl, cyclohexyl, phenoxy, nitrophenoxy, acetylphenoxy, butoxycarbonylphenoxy, methoxyphenoxy, butoxyphenoxy, methylphenoxy, bromophenoxy, ethylphenoxy, chlorophenoxy, dichlorophenoxy, phenylmercapto, dichlorophenylmercapto, methoxycarbonylphenylmercapto, nitrophenylmercapto, phenylamino, chlorophenylamino or ethylphenylamino or; (aryloxy- or lower-alkoxy-) $—CO(CH_2)_{m-1}$, wherein m = 1 to 9, cyclohexyl, methylcyclohexyl, dimethylcyclohexyl, phenyl and phenyl substituted by methyl, chloro, nitro, methoxy, phenoxy, phenyl, phenylmercapto, phenylazo; naphthyl, alkoxy of up to 8 carbon atoms which is unsubstituted or substituted by chloro or methoxy; phenoxy which is unsubstituted or substituted by chloro, bromo, nitro, carbethoxy, methoxy, methyl or ethyl; alkylamino of 1 to 8 carbon atoms, cyclohexylamino, phenylamino which is unsubstituted or substituted by chloro, bromo, methyl, methoxy, ethoxy, nitro, trifluoromethyl, methoxycarbonyl, ethoxycarbonyl; or napthylamino,

R_6 and R_7 are independently selected from the group consisting of lower alkyl which is unsubstituted or substituted by:

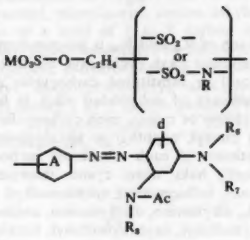
halo, phenyl, lower alkoxy, lower alkylcarbonyloxy, lower alkylcarbonylamino, benzoyloxy, benzoylamino which is unsubstituted or substituted by chloro, bromo, methyl, ethyl, methoxy or ethoxy; cyano, hydroxy, phenoxy, phenylcarbonyl, phenylsulphonyloxy, phenoxycarbonyl, or phenylthio, wherein said phenoxy, phenylcarbonyl, phenylsulphonyloxy, phenoxycarbonyl or phenylthio groups are unsubstituted or substituted by chloro, bromo, methyl, ethyl, methoxy, or ethoxy; lower alkylsulphonyl, lower alkoxycarbonyloxy, phenoxycarbonyloxy, phenylaminocarbonyloxy, aminocarbonyl, lower alkylaminocarbonyl, di-loweralkylaminocarbonyl, lower alkyl carbonyl, lower alkoxycarbonyl or cinnamoyl, and

R is hydrogen, alkyl of up to 4 carbon atoms which is unsubstituted or substituted by phenyl, cyano, hydroxy or chloro; or is cyclohexyl,

and the benzene ring A is unsubstituted or substituted by chloro, bromo, methyl, ethyl, nitro, cyano, trifluoromethyl, methyl- or ethyl-sulphonyl, N-(methyl-, ethyl-, propyl-, butyl- or cyanoethyl-) aminosulphonyl, N,N-bis-(methyl-, ethyl-, or hydroxyethyl-) aminosulphonyl, methoxycarbonyl, ethoxycarbonyl, acetylamino or propionylamino, and

M is hydrogen or sodium.

2. A dyestuff which corresponds to the formula



wherein

R_6 and R_7 are independently selected from the group consisting of lower alkyl which is unsubstituted or substituted by:

halo, phenyl, lower alkoxy, lower alkylcarbonyloxy, lower alkylcarbonylamino, benzoyloxy, benzoylamino which is unsubstituted or substituted by chloro, bromo, methyl, ethyl, methoxy or ethoxy; cyano, hydroxy, phenoxy, phenylcarbonyl, phenylsulphonyloxy, phenoxycarbonyl, or phenylthio, wherein said phenoxy, phenylcarbonyl, phenylsulphonyloxy, phenoxycarbonyl or phenylthio groups are unsubstituted or substituted by chloro, bromo, methyl, ethyl, methoxy, or ethoxy; lower alkylsulphonyl, lower alkoxycarbonyloxy, phenoxycarbonyloxy, phenylaminocarbonyloxy, aminocarbonyl, lower alkylaminocarbonyl, di-loweralkylaminocarbonyl, lower alkyl carbonyl, lower alkoxycarbonyl or cinnamoyl, and

R_6 can also represent hydrogen;

Ac represents $—CO—R_5$, C_1–C_4 alkylsulphonyl or an unsubstituted or substituted benzenesulphonyl group wherein the substituents are methyl, bromo, or nitro,

R_5 is hydrogen, alkyl of up to 17 carbon atoms which is unsubstituted or substituted by hydroxy, methylmercapto, chloro, bromo, cyano, acetyl, ethoxy, phenyl, benzoyl, cyclohexyl, phenoxy, nitrophenoxy, acetylphenoxy, butoxycarbonylphenoxy, methoxyphenoxy, butoxyphenoxy, methylphenoxy, bromophenoxy, ethylphenoxy, chlorophenoxy, dichlorophenoxy, phenylmercapto, dichlorophenylmercapto, methoxycarbonylphenylmercapto, nitrophenylmercapto, phenylamino, chlorophenylamino or ethylphenylamino (aryloxy- or lower-alkoxy-) $—CO(CH_2)_{m-1}$, wherein m = 1 to 9, cyclohexyl, methylcyclohexyl, dimethylcyclohexyl, phenyl or phenyl substituted by methyl, chloro, nitro, methoxy, phenoxy, phenyl, phenylmercapto, phenylazo; napthyl, alkoxy of up to 8 carbon atoms which is unsubstituted or substituted by chloro or methoxy; phenoxy which is unsubstituted or substituted by chloro, bromo, nitro, carbethoxy, methoxy, methyl or ethyl; alkylamino of 1 to 8 carbon atoms, cyclohexylamino, phenylamino which is unsubstituted or substituted by chloro, bromo, methyl, methoxy, ethoxy, nitro, trifluoromethyl, methoxycarbonyl, ethoxycarbonyl; or napthylamino,

R_8 is hydrogen or lower alkyl,

d is hydrogen, chloro, bromo, lower alkyl, lower alkylthio, phenyl, phenoxy, phenylthio, loweralkoxycarbonyl or loweralkylaminocarbonyl,

R is hydrogen, alkyl of up to 4 carbon atoms which is unsubstituted or substituted by phenyl, cyano, hydroxy or chloro; or is cyclohexyl,

and the benzene ring A is unsubstituted or substituted by chloro, bromo, methyl, ethyl, nitro, cyano, trifluoromethyl, methyl- or ethyl-sulphonyl, N-(methyl-, ethyl-, propyl-, butyl- or cyanoethyl-) aminosulphonyl, N,N-bis-(methyl-, ethyl-, or hydroxyethyl-) aminosulphonyl, methoxycarbonyl, ethoxycarbonyl, acetylamino or propionylamino, and

M is hydrogen or sodium.

3,998,806

α- AND β-2′-DEOXY-6-R-SUBSTITUTED SELENOGUANOSINE COMPOUNDS

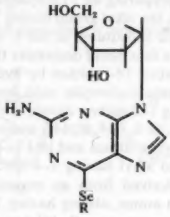
Leroy B. Townsend, Salt Lake City, Utah, assignor to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Feb. 26, 1975, Ser. No. 553,079

Int. Cl.² C07H *19/16*

U.S. Cl. 536—24 **8 Claims**

1. α-2′-deoxy-6-R-selenoguanosine according to the following structural formula



where R is selected from the group consisting of monocyclic aryl, and imidazole.

3,998,807

ARABINOFURANOSYL CYTOSINES AND METHODS OF MAKING

John G. Moffatt, Los Altos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Mar. 3, 1972, Ser. No. 231,754

Int. Cl.² C07H *19/08*

U.S. Cl. 536—23 **13 Claims**

1. A compound selected from the group consisting of 1-(3′-O-behenoyl-β-D-arabinofuranosyl)-cytosine; 1-(3′-O-cerotoyl-β-D-arabinofuranosyl)-cytosine; 1-(3′,5′-di-O-behenoyl-β-D-arabinofuranosyl)-cytosine; 1-(3′,5′-di-O-cerotoyl-β-D-arabinofuranosyl)-cytosine; and pharmaceutically acceptable salts thereof.

3,998,808

COMPOSITIONS OF MATTER D-HETERO-1,1-(α-THIOCYANOACETYL) COMPOUNDS

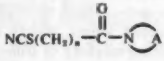
Sidney B. Richter, Chicago, and Alfred A. Levin, Skokie, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 731,337, May 22, 1968, abandoned. This application May 18, 1971, Ser. No. 144,684

Int. Cl.² C07D *207/02, 211/16, 223/02*

U.S. Cl. 260—239 B **9 Claims**

1. A compound of the formula



wherein A is a saturated or mono olefinically unsaturated aliphatic hydrocarbon chain having from 4 to 7 carbon atoms which optionally contains a maximum of three substituents selected from the group consisting of lower alkyl, lower alkoxy and halogen; and *n* is an integer from 1 to 3.

3,998,809

BENZODIAZEPINE DERIVATIVES

Wolfgang Milkowski, Burgdorf; Renke Budden, Peine; Siegfried Funke, Hannover; Rolf Huschens, Hannover; Hans-Günther Liepmann, Hannover; Werner Stühmer, Eldagsen, and Horst Zeugner, Hannover, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

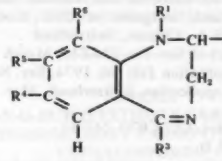
Filed May 1, 1973, Ser. No. 355,986

Claims priority, application Germany, May 3, 1972, 2221558

Int. Cl.² C07D *243/16, 401/06, 403/06, 413/06*

U.S. Cl. 260—239 BD **22 Claims**

1. A benzodiazepine derivative having the formula



in which

R^1 is hydrogen, methyl, ethyl, benzyl, or 2-chloroethyl,

R^2 is hydroxy, alkoxy of 1 to 3 carbon atoms and being straight or branched, ethoxycarbonyl, cyano, chloro, bromo, carboxyl, amino, aminocarbonyl, methylcarbonylamino, ethoxycarbonylamino, isopropylaminocarbonyl, methylaminocarboxyl, or ethylaminocarboxyl,

R^3 is phenyl, 2-methylphenyl, 2-chlorophenyl, 2-fluorophenyl, 2-bromophenyl, 2-(trifluoromethyl)phenyl, 3-(trifluoromethyl)phenyl, 3,4-dimethoxyphenyl,2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,6-dichlorophenyl, or 3,4-dichlorophenyl,

R^4 is hydrogen, fluoro, chloro, bromo, methyl, methoxy, methylthio, or nitro,

R^5 is hydrogen or methoxy,

R^6 is hydrogen or nitro and

R^4 and R^5 together may be ethylenedioxy.

3,998,810

N-SUBSTITUTED 1-AMINO-3-PHENOXY-PROPAN-2-OL COMPOUNDS AND THERAPEUTIC COMPOSITIONS CONTAINING THEM

Fritz Wiedemann; Max Thiel, both of Mannheim; Kurt Stach, Mannheim-Waldhof; Karl Dietmann, Mannheim-Vogelstang, and Gisbert Sponer, Hemsbach, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed July 10, 1974, Ser. No. 487,423

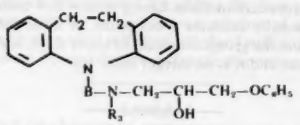
Claims priority, application Germany, Aug. 3, 1973, 2339396

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C07D *228/38*

U.S. Cl. 260—239 D **7 Claims**

1. An N-substituted 1-amino-3-phenoxy-propan-2-ol of the formula



wherein

B is straight or branched chain alkylene or hydroxyalkylene of from 2 to 5 carbon atoms; and

R_3 is hydrogen or alkyl of up to 3 carbon atoms;

and the physiologically compatible acid addition salts thereof.

3,998,811
OPTICALLY ACTIVE 1,4-BENZODIAZEPINES AND PROCESS FOR THE PREPARATION THEREOF

Franjo Kajfez; Nikola Blazevic, and Vitomir Sunjic, all of Chiasso, Switzerland, assignors to CRC Compagnia di Recerca Chimica S.A., Chiasso, Switzerland

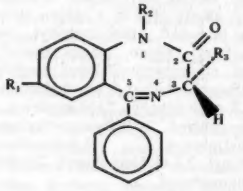
Continuation-in-part of Ser. No. 234,645, March 14, 1972, abandoned. This application July 30, 1974, Ser. No. 493,145

Claims priority, application Switzerland, Mar. 17, 1971, 3868/71

Int. Cl.² C07D *243/24*

U.S. Cl. 260—239.3 D **15 Claims**

1. An optically active compound having the formula



having an asymmetric carbon atom in position 3, said asymmetric carbon atom having the S configuration, wherein R_1 is selected from the group consisting of hydrogen, halogen, nitro, and trifluoromethyl, R_2 is selected from the group consisting of hydrogen and C_{1-4} lower alkyl and R_3 is selected from the group consisting of C_{1-4} lower alkyl, hydroxy-C_{1-4} lower alkyl phenyl, hydroxy phenyl, benzyl, hydroxy benzyl, and 3′-methyleneindolyl.

3,998,812
STYRYL-PYRAZOLINE COMPOUNDS

Helmut Mengler, Frankfurt am Main; Günter Rösch, Altenhain, Taunus; Erich Schinzel, Hofheim, Taunus, and Otto Smerz, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

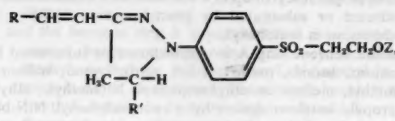
Division of Ser. No. 168,768, Aug. 3, 1971, Pat. No. 3,835,126, which is a continuation-in-part of Ser. No. 816,388, April 15, 1969, abandoned. This application Mar. 7, 1974, Ser. No. 449,075

Claims priority, application Switzerland, Apr. 19, 1968, 5801/68

Int. Cl.² C07D *231/42, 233/00, 235/00, 261/16*

U.S. Cl. 260—239.9 **5 Claims**

1. A compound of the formula



wherein R and R′ are phenyl or phenyl substituted by chlorine and Z is alkyl of 1 to 18 carbon atoms or lower alkyl substituted by lower alkoxy or by di-(lower alkyl)-amino.

3,998,813
PROCESS FOR THE PREPARATION OF 11β-HYDROXY-18-ALKYL-ESTRANE COMPOUNDS

Hendrik Paul de Jongh, Oss, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

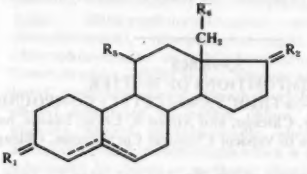
Filed June 30, 1975, Ser. No. 591,979

Int. Cl.² C07J *5/00*

U.S. Cl. 260—239.55 C **20 Claims**

1. A process for preparing an 11β-hydroxy-18-alkyl steroid of the estrane series, the alkyl group having 1–4 carbon atoms, which steroid may be substituted in the 3- and/or 17-position by an oxo group or a functional derivative thereof, in the 1, 2, 3, 4, 5, 6, 7, 15 and/or 16-position by hydroxy, acyloxy derived from an organic carboxylic acid having 1–18 carbon atoms, alkoxy having 1–2 carbon atoms, tetrahydropyranyloxy or trimethylsilyloxy, in 1, 6, 7, 9, 11α and/or 16-position with alkyl having 1–2 carbon atoms and in 17α-position with saturated or unsaturated alkyl having 1–4 carbon atoms next to hydroxy, acyloxy derived from an organic carboxylic acid having 1–18 carbon atoms, alkoxy having 1–2 carbon atoms, tetrahydropyranyloxy or trimethylsilyloxy in 17β-position, and may have a double bond in 4,5-, 5,6-, or 5,10-position, which comprises reacting the corresponding 11β-hydroxy-13-methyl-gonane compound with an acyl hypoiodite, reacting the corresponding 11β-hydroxy-13-iodomethyl-gonane compound thus obtained, after protecting the 11β-hydroxy group in the form of an ether, with an alkyl halidem the alkyl group having 1–4 carbon atoms, in the presence of an alkali metal or with an alkali metal alkyl compound, the alkyl group having 1–4 carbon atoms, or with dimethylformamide in the presence of an alkali metal alkyl compound, the alkyl group having 1–4 carbon atoms, followed by a treatment with a proton donor, whereafter in the latter case the thus obtained 18-carbaldehyde group is reduced or reacted with Wittig reagent, followed by reduction of the thus obtained 18-alkenyl group.

19. A compound having the formula



, wherein

wherein

R_1 = H_2, H(OR_3), O or ketalised O;

R_2 = O, ketalised O, H(OR_4) or (α-alkyl)(βOR_4), the alkyl group having 1–4 carbon atoms and R_3 and R_4 being H or a protecting group such as acyl or alkyl;

R_5 = OH, acyloxy derived from an organic carboxylic acid having 1–18 carbon atoms, alkoxy having 1–2 carbon atoms, tetrahydropyranyloxy or trimethylsilyloxy;

R_6 = I or

and a double bond is present in the 4,5- or 5,6-position.

3,998,814
PROCESS FOR PREPARING β-AMINO-α-BENZYLACRYLONITRILES

Ronald M. Cresswell, Scarsdale; John W. Mentha, Hartsdale, and Russell L. Seaman, Chappaqua, all of N.Y., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 263,174, June 15, 1972, abandoned, which is a division of Ser. No. 16,606, March 4, 1970, Pat. No. 3,697,512. This application May 2, 1974, Ser. No. 466,476

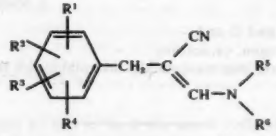
Claims priority, application United Kingdom, Mar. 6, 1969, 11908/69; Mar. 6, 1969, 11909/69; May 16, 1969, 25171/69; June 13, 1969, 30247/69

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

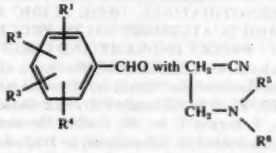
Int. Cl.² C07D *295/14;* **C07C** *120/00*

U.S. Cl. 260—240 R **10 Claims**

1. The method of preparing a compound of the formula



which comprises reacting



wherein R^1-R^4 are the same or different and each is hydrogen, halogen, lower alkyl, lower alkoxy, or benzyloxy, or R^3 and R^4 taken together is methylenedioxy when both R^1 and R^2 are hydrogen in the presence of a base selected from the group consisting of hydroxides, alkoxides and methylsulphinyl carbanion in association with an alkali metal or quaternary ammonium cation in a polar aprotic solvent compatible with and dissolving both reactants, wherein NR^5R^6 is selected from the group consisting of anilino, N-methyl anilino, N-ethyl anilino where the phenyl ring thereof is substituted by one or more halogen, alkyl or alkoxy, monoalkylamino, benzylamino, α-naphthylamino, β-naphthylamino, . pyrrolidino, piperdino, piperazino and morpholino and wherein the said NR^5R^6 group has not more than 12 carbon atoms and can have only one hydrogen atom for R^5 and R^6.

3,998,815
1-HYDROCARBONOYLOXYMETHYL-3-CARBAMOYL OR 3-CARBOETHOXY-PYRIDINIUM SALTS

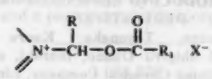
Nicolae S. Bodor, Lawrence, Kans., assignor to Interx Research Corporation, Lawrence, Kans.

Filed June 24, 1974, Ser. No. 482,513

Int. Cl.² C07D *213/20*

U.S. Cl. 260—240 K **10 Claims**

1. A soft quaternary compound of the formula (I):



(I)

wherein $\geq N$ represents 3-carbamoyl-pyridyl or ethylnicotinyl; wherein R represents a member selected from the group consisting of hydrogen, C_1-C_8 open chain or cyclo alkyl, C_1-C_8 alkoxyalkyl, C_1-C_8 acyloxyalkyl, C_1-C_8 haloalkyl, C_1-C_8 carboxyalkyl, phenyl, naphthyl, and substituted phenyl or naphthyl, the substituents of which are selected from the group consisting of halogen, O-loweralkyl (C_1-C_4), O-formyl, O-acetyl, O-propionyl, O-benzoyl, nitro, carboxyl, and carboethoxy; wherein R_1 which may be the same or different, represents any member defined by R above with the proviso that R_1 cannot be hydrogen; and wherein X^- represents a member selected from the group consisting of halogen or any other equivalent anion and a soft quaternary compound selected from the group consisting of II) 1-(cinnamoyloxymethyl)-3-carbamoyl-pyridinium chloride, III) 1-(alpha-cinnamoyloxyethyl)-3-carbamoyl-pyridinium chloride, IV) 1-(cinnamoyloxymethyl)-ethylnicotinate chloride and V) 1-(alpha-cinnamoyloxybenzyl)-ethylnicotinate chloride.

3,998,816
7-[5-N-(n-BUTOXYETHOXY CARBONYL AND 2-CHLOROETHOXY CARBONYL)-AMINO] CEPHALOSPORINS C

Shigeo Seki, Tokyo, and Toshiyasu Ishimaru, Suita, both of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

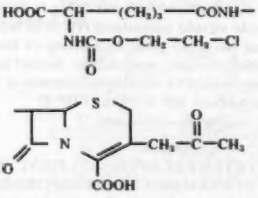
Filed Apr. 2, 1974, Ser. No. 457,280

Claims priority, application Japan, Apr. 16, 1973, 48-42129; May 12, 1973, 48-521116; Nov. 29, 1973, 48-133012; Nov. 29, 1973, 48-133013; Nov. 29, 1973, 48-133014; Nov. 29, 1973, 48-133015; Dec. 28, 1973, 49-144641; Dec. 28, 1973, 49-144642; Dec. 28, 1973, 49-144643; Dec. 28, 1973, 49-144644

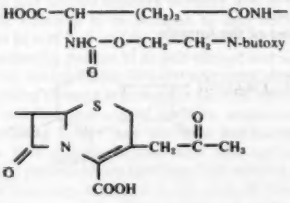
Int. Cl.² C07D *501/60*

U.S. Cl. 260—243 C **2 Claims**

1. A cephem derivative of the formula



2. A cephem derivative of the formula

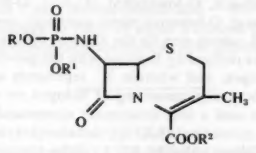


3,998,817
PROCESS FOR PRODUCING CEPHALOSPORANIC ACID DERIVATIVES

Masataka Fukumura, Toyonaka; Kaoru Maeshima, Takarazuka, and Shigeru Okano, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

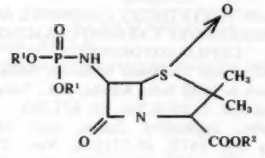
Filed Nov. 14, 1973, Ser. No. 415,880
Claims priority, application Japan, Nov. 15, 1972, 47-115113
Int. Cl.² C07D *501/10*
U.S. Cl. 260—243 C **6 Claims**

1. A process for producing a compound of formula (II)



(II)

wherein R^1 is a $C_1 - C_4$ alkyl group and R^2 is an ester protective group selected from the group consisting of methyl, 2,2,2-trichloroethyl, benzyl, p-nitrobenzyl, p-methoxybenzyl, penacyl, benzhydryl and trimethylsilyl, which comprises the step of treating a compound of formula (I)



(I)

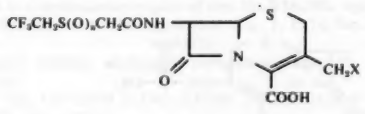
wherein R^1 and R^2 are as defined above, with an acidic compound selected from the group consisting of methanesulfonic acid, p-toluenesulfonic acid, naphthalenesulfonic acid, methanephosphonic acid, dichloromethanephosphonic acid, monomethylphosphonate, monophenylphosphonate, acetic acid, propionic acid, acetic anhydride, propionic anhydride, phosphoric acid, sulfuric acid, phyridine phophate, pyridine mono-o-substitued orthophosphate and quinoline hydrochloride, the amount of said acidic compound being from 0.01 to 0.2 mole per one mole of said compound (I), in at least one inert solvent selected from the group consisting of benzene, toluene, dichloroethane, dioxane, acetonitrile, methyl isobutyl ketone, dimethylformamide and dimethylacetamide at a temperature ranging from about 80° to about 170° C

3,998,818
TRIFLUOROETHYLMERCAPTO, -SULFINYL OR -SULFONYL ACETAMIDOCEPHALOSPORINS

Robert M. DeMarinis, King of Prussia, Pa., assignor to Smith-Kline Corporation, Philadelphia, Pa.

Division of Ser. No. 428,536, Dec. 26, 1973, Pat. No. 3,957,770. This application Dec. 29, 1975, Ser. No. 644,476
Int. Cl.² C07D *501/28, 501/36*
U.S. Cl. 260—243 C **10 Claims**

1. A compound of the formula



where

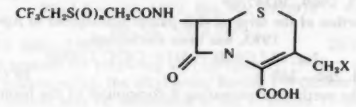
n is 0, 1, or 2; and
X is OCH_3, or SCH_3
or a non-toxic pharmaceutically acceptable salt thereof.

3,998,819
TRIFLUOROETHYL-MERCAPTO, -SULFINYL OR -SULFONYL ACETAMIDOCEPHALOSPORINS

Robert M. DeMarinis, King of Prussia, Pa., assignor to Smith-Kline Corporation, Philadelphia, Pa.

Division of Ser. No. 428,536, Dec. 26, 1973, Pat. No. 3,957,770. This application Dec. 29, 1975, Ser. No. 644,477
Int. Cl.² C07D *501/28, 501/22*
U.S. Cl. 260—243 C **10 Claims**

1. A compound of the formula



where

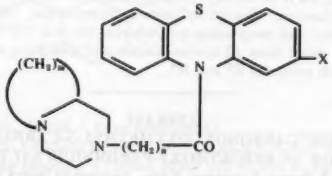
n is 0, 1, and 2; and
X is hydrogen, or acetoxy
or a non-toxic pharmaceutically acceptable salt thereof.

3,998,820
10'-[ω-N-(1,4-DIAZABICYCLO-[4,m,o]-ALKANYL)-ACYL]-PHENOTHIAZINES, THEIR ACIDIC ADDITION SALTS AND QUATERNARY SALTS, PROCESS FOR PRODUCING SAME AND USE

Arkady Mikhailovich Likhosherstov, Smolnaya ulitsa, 33, kv. 107; Liya Semenovna Nazarova, Petrovsko-Razumovsky proezd, 20, kv. 22; Alexandr Petrovich Skoldinov, ulitsa Alabyana, 3, korpus 1, kv. 60; Galina Alexandrovna Markova, Kotelnicheskaya naberezhnaya, 1/15, kv. 320, and Natalya Veniaminovna Kaverina, Novopeschanaya ulitsa, 3, kv. 32, all of Moscow, U.S.S.R.

Continuation of Ser. No. 230,987, March 1, 1972, abandoned. This application July 1, 1974, Ser. No. 485,155
Int. Cl.² G07B *279/26*
U.S. Cl. 260—243 A **5 Claims**

1. A compound selected from the group consisting of a 10'-[ω-N-(1,4-diazabicyclo-[4,m,o,]-alkanyl)-acyl]-phenothiazine of the formula:



where X is selected from the group consisting of H, Cl, and CF_3; *n* is 1, 2 or 3 and *m* is 3 or 5, a pharmaceutically acceptable acidic addition salt thereof and a haloalkyl quaternary salt thereof.

3,998,821
PROCESS FOR PREPARING CEPHALOSPORIN COMPOUNDS

Niall Galbraith Weir, London, England, assignor to Glaxo Laboratories Limited, Greenford, England

Division of Ser. No. 167,870, July 30, 1971, Pat. No. 3,853,860. This application Aug. 9, 1974, Ser. No. 496,330
Claims priority, application United Kingdom, Aug. 6, 1970, 38020/70; July 15, 1971, 38020/70
Int. Cl.² C07D *501/02*
U.S. Cl. 260—243 C **6 Claims**

1. In a process for the preparation of a Δ^3-4-carboxy cephalosporin having at the 3-position a group $-CH_2CH_2R^4$ wherein R^4 is hydrogen, $-CO_2R^5$, $-COR^6$, $-CON(R^6)_2$, $-S(O)R^5$, $-S(O)_2R^5$, nitro, lower alkyl, C_5 or C_6 cycloalkyl, phenyl or cyano; R^5 being lower alkyl, benzyl, phenyl, naphthyl, cyclohexyl or cyclopentyl; R^6 being hydrogen or R^5; wherein the improvement comprises the steps or reacting a Δ^2- or Δ^3-4-carboxy or protected carboxy cephalosporin or the 1-oxide thereof; said cephalosporin having at the 3-position a group $-CH_2Hal$ in which Hal is chlorine, bromine or iodine with a phosphorus ylid of the formula

$$(R^3)_3P{=}CH{-}R^4 \qquad \text{(III)}$$

wherein the R^3 groups, which may be the same or different, are each C_3–C_{10} alkyl, C_5 or C_6 cycloalkyl, phenyl or di(lower alkyl) amino and R^4 has the meaning defined above to provide at the 3-position a

$$-CH_2-\underset{\displaystyle R^4}{\underset{|}{C}}{=}P(R^3)_3$$

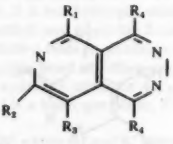
group, wherein R^3 and R^4 have the above defined meanings, and reductively cleaving the carbon to phosphorus bond to provide a cephalosporin with a $-CH_2CH_2R^4$ group at the 3-position where R^4 is as defined.

3,998,822
MORPHOLINO CONTAINING PYRIDO (3,4-D) PYRIDAZINES

Shojiro Yurugi, Kyoto, and Shintaro Kikuchi, Hyogo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 315,315, Dec. 15, 1972, Pat. No. 3,948,908. This application Dec. 23, 1975, Ser. No. 643,954
Claims priority, application Japan, Nov. 18, 1972, 47-115762; Nov. 20, 1972, 47-116468; Nov. 20, 1972, 47-116469
Int. Cl.² C07D *471/04*
U.S. Cl. 260—246 B **4 Claims**

1. A pyrido (3,4-d)pyridazine derivative of the formula:



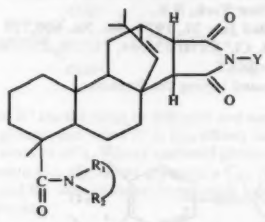
wherein R_1 is hydrogen or an alkyl group of 1 to 4 carbon atoms; R_2 is a substituted or unsubstituted phenyl, naphthyl, furyl or pyridyl, the number of substituents being one or two, the substituents being those selected from the group consisting of lower alkoxy groups of 1 to 3 carbon atoms, lower alkyl groups of 1 to 3 carbon atoms, halogen and nitro; R_3 is hydrogen or a lower alkoxy group of 1 to 4 carbon atoms; and R_4 is a substituted or unsubstituted morpholino, the substituents being one or two, the substituents being those selected from the group consisting of methyl and ethyl, and at least one of the residue R_2 and the residue R_4 is substituted by one or two substituents, and a pharmaceutically acceptable salt thereof.

3,998,823
NOVEL DERIVATIVES OF MALEOPIMARIC ACID

John Bodenham Taylor, Down Ampley; Peter John Ramm, Swindon, both of England, and Ferdinand Fried, Brussels, Belgium, assignors to Roussel-UCLAF, Paris, France

Filed Oct. 12, 1973, Ser. No. 405,937
Claims priority, application United Kingdom, Oct. 13, 1972, 47437/72
Int. Cl.² C07D *295/00*
U.S. Cl. 260—247.2 A **5 Claims**

1. A compound of the general formula:

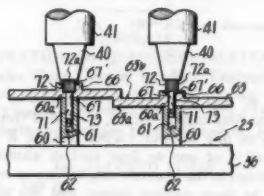


wherein R_1 and R_2 together with the intervening nitrogen form a saturated six member heterocyclic ring which may be interrupted by another nitrogen or an oxygen and may be substituted by a lower alkyl, or hydroxy lower alkyl; Y is a hydroxy lower alkyl.

3,998,824
METHOD OF EMBEDDING INSERTS IN A THERMOPLASTIC BODY

Hiroshi Otsuki, and Hideharu Yamamoto, both of Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 422,130, Dec. 6, 1973, abandoned. This application June 24, 1975, Ser. No. 589,900
Claims priority, application Japan, Dec. 11, 1972, 47-124111
Int. Cl.² B29D *3/00*; B29F *5/00*
U.S. Cl. 264—249 **9 Claims**



1. The method for providing a body of synthetic resin having first and second opposed surfaces with at least one metal element which is to be secured to said body in projecting relation to said first surface, each said metal element comprising a mounting portion at an end thereof and another portion, said body having a hole for each said metal element, each said hole passing through said body to have its opposite ends opening at said first and second surfaces, respectively, said other portion being longer than said hole and having a cylindrical section that extends beyond said first surface before said mounting portion enters said hole, said method comprising the steps of inserting each said metal element into its respective hole at the end of the latter opening at said second surface,

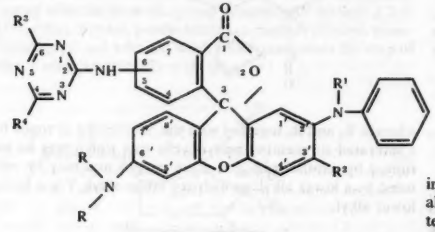
pressing each said metal element in the axial direction of said hole toward said first surface of the body so as to urge said mounting portion into said hole, separately guiding said cylindrical section from beyond said first surface and simultaneously applying heat to said element while said element is being pressed and guided in the axial direction, said heat flowing from said element into said body to soften said body at the region of contact of said mounting portion therewith until said mounting portion is contained in said hole in a predetermined, guided position, and hardening said body at said region of its contact with the mounting portion of said metal element.

3,998,825
TRIAZINYL-BENZOFLUORANS

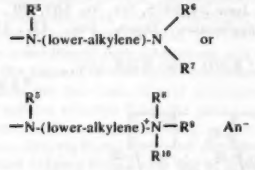
Nathan Norman Crounse, Cincinnati, and Paul Joseph Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,719
Int. Cl.² C07D *251/44, 251/50, 251/70*
U.S. Cl. 260—249.5 **11 Claims**

1. A compound having the formula



where R represents non-tertiary alkyl of one to four carbon atoms; R^1 and R^2 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^3 and R^4 represent chlorine, or one of the groups



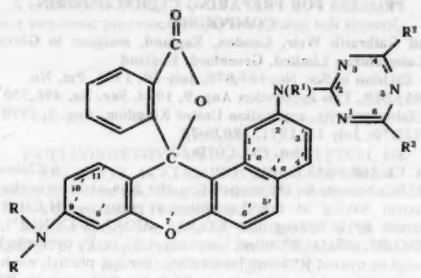
in which R^5, R^6 and R^7 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^8 and R^9 represent non-tertiary alkyl of one to four carbon atoms; R^{10} represents non-tertiary alkyl of one to four carbon atoms, benzyl or benzyl substituted in the benzene ring by one or two of halo or alkyl of one to three carbon atoms; and An represents an anion selected from the group consisting of halides, hydroxy, alkanoates, nitrate, phosphate, alkylsulfates and arylsulfates.

3,998,826
TRIAZINYL-BENZOFLUORANS

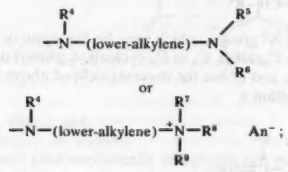
Nathan Norman Crounse, Cincinnati, and Paul Joseph Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Filed July 31, 1975, Ser. No. 600,720
Int. Cl.² C07D *251/44, 251/50, 251/70*
U.S. Cl. 260—249.5 **7 Claims**

1. A compound having the formula



where R represents non-tertiary alkyl of one to four carbon atoms; R^1 represents hydrogen or non-tertiary alkyl of one to four carbon atoms; R^2 and R^3 represent chlorine or one of the groups



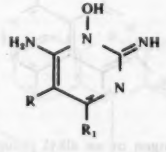
in which R^4, R^5 and R^6 represent hydrogen or non-tertiary alkyl of one to four carbon atoms; R^7 and R^8 represent non-tertiary alkyl of one to four carbon atoms; R^9 represents non-tertiary alkyl of one to four carbon atoms, benzyl or benzyl substituted in the benzene ring by one or two of halo or alkyl of one to three carbon atoms; and An represents an anion selected from the group consisting of halides, hydroxy, alkanoates, nitrate, phosphate, alkylsulfates and arylsulfates.

3,998,827
6-AMINO-4-(SUBSTITUTED PIPERIDINO)-1,2-DIHYDRO-1-HYDROXY-2-IMINOPYRIMIDINES

Richard C. Thomas, Jr., and Harry Harpootlian, both of Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 132,153, April 7, 1971, abandoned. This application Feb. 27, 1975, Ser. No. 553,799
Int. Cl.² C07D *239/34*
U.S. Cl. 260—256.4 C **4 Claims**

1. A compound of the formula:



where R is hydrogen or lower alkyl and R_1 is piperidino having attached as substituents on carbon atoms thereof 0 to 3 lower alkyl, inclusive, and in addition 1 or 2 hydroxy or lower acyloxy groups selected from the group consisting of acetoxy and propionoxy, the free base form or an acid addition salt selected from the group consisting of hydrochloric, hydrobromic, maleic, and pamoic.

3,998,828

4-[2-(1,3-DIALKYL-1,2,3,4-TETRA-HYDROPYRIMIDINE-2,4-DIONE-5-CARBOXAMIDO)ETHYL]-1-PIPERIDINE SULFONAMIDE

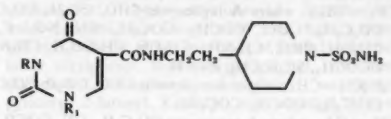
Hans E. Wiedermann, Niantic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 546,003, Jan. 31, 1975, Pat. No. 3,936,445. This application Nov. 7, 1975, Ser. No. 629,771

Int. Cl.² C07D *401/12*

U.S. Cl. 260—256.5 R **3 Claims**

1. A sulfamide compound of the formula:



wherein R and R_1 are each alkyl having from 1 to 3 carbon atoms.

3,998,829

STEROID ANAESTHETICS OF THE PREGNANE AND 19-NORPREGNANE SERIES

Gordon Hanley Phillips, Wembley; Robin Lawrence, London; Leslie Stephenson, London, and Barry Edward Ayres, Amersham, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

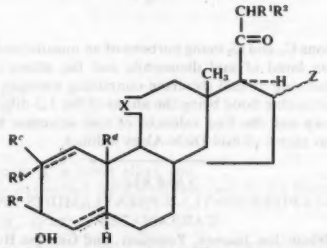
Filed May 8, 1973, Ser. No. 358,381

Claims priority, application United Kingdom, May 12, 1972, 22489/72

Int. Cl.² C07J *43/00*

U.S. Cl. 260—239.5 **11 Claims**

1. A 3α-hydroxy steroid of the pregnane or 19-norpregnane series selected from the group consisting of a compound of the formula:



wherein R^a is hydrogen or methyl; R^b is hydrogen or when R^c and R^a are hydrogen, methyl; R^c is hydrogen or, when R^b and R^a are hydrogen, a C_{1-6} alkoxy or a C_{1-5} alkyl group; R^d is hydrogen or methyl; X is two hydrogen atoms or an oxo group; Z is hydrogen or methyl; and when the 2- and 3β-positions are unsubstituted the dotted lines at positions 1,2 and 4,5 represent an optional double bond at either one of these two positions; and R^1 is a hydrogen atom or a C_{2-5} alkoxy carbonyl group; and when R^1 is a hydrogen atom, R^2 is a methyl group substituted by:

a. a group $—NR^6R^7$ where R^6 and R^7 taken together with the nitrogen atom represent a phthalimido group or an unsubstituted saturated 5–6 membered ring which may contain a sulphur or oxygen atom; or said 5-6 membered ring substituted by one or more methyl groups; or

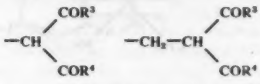
b. a hydroxyl group or C_{1-6} alkoxy group which may be substituted by a group of the formula $—NR^6R^7$ where R^6 and R^7 taken together with the nitrogen atom represent an unsubstituted saturated 5–6 membered ring which may contain a sulphur or oxygen atom; or said 5-6 membered ring substituted by one or more methyl groups; or

c. a group $—O.CO.R^5$ where R^5 is a C_{1-5} alkyl group substituted by a group $—NR^6R^7$ as defined in (b) above or in which R^6 and R^7 may additionally be the same or different C_{1-6} alkyl group;

d. a fluorine or chlorine atom; or

e. a group $—SR^8$ where R^8 is a C_{1-6} alkyl which may be substituted by a morpholino group or R^8 is a carbon-attached pyridyl or pyrimidyl group; or

f. a group $—SCOR^9$ where R^9 is a C_{1-6} alkyl group which may be substituted by a group $—NR^6R^7$ as defined in (b) above or R^9 is a carbon-attached pyridyl group; or R^2 is a C_{1-5} alkanoyl group which may be substituted by a group $—NR^6R^7$ as defined in (b) above; or R^2 is a C_{2-5} alkoxy carbonyl group or R^2 is a pyridine carbonyl group; or R^2 is a $di(C_{1-3})$ alkoxy methyl group; or R^2 is a group of the formula:



where R^3 and R^4 are the same or different and are C_{1-4} alkyl or C_{1-4} alkoxy groups; and when R^1 is C_{2-5} alkoxy carbonyl, R^2 is a hydrogen atom or a C_{2-5} alkoxy carbonyl group, or R^1 and R^2 may represent a C_{1-6} alkylidene group or a C_{2-6} divalent alkylene group; and the salts of those compounds having acidic or basic substituents.

3,998,830

PREPARATION OF BROMACIL/DIURON COMPLEX

Archibald Miller Hyson, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 449,755, March 11, 1974, Pat. No. 3,914,230, which is a continuation-in-part of Ser. No. 159,547, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 56,973, July 21, 1970, abandoned. This application Apr. 1, 1975, Ser. No. 564,214

Int. Cl.² C07D *239/54*

U.S. Cl. 260—260 **6 Claims**

1. A process of preparing a bromacil/diuron complex wherein the bromacil and diuron are complexed in a molar ratio of 1:1 consisting of intimately contacting the bromacil and diuron so as to allow them to react with one another and maintaining them in intimate contact with one another until substantially all of at least one of them has reacted with the other.

3,998,831

PREPARATION OF QUINOLINE DERIVATIVES

Adrian Charles Ward Curran, Reading, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

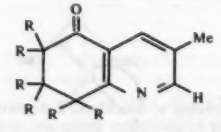
Filed July 5, 1974, Ser. No. 486,125

Claims priority, application United Kingdom, July 12, 1973, 33252/73

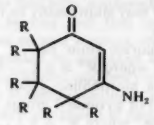
Int. Cl.² C07D *215/20*

U.S. Cl. 260—289 H **2 Claims**

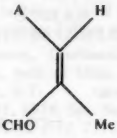
1. A process for preparing a 5-oxotetrahydroquinoline of formula



where R is independently selected from hydrogen and methyl, which process comprises the step of heating in toluene or glacial acetic acid a compound of formula



where R is as defined above, with a compound of formula



where A is a lower alkoxy of 1 to 4 carbon atoms.

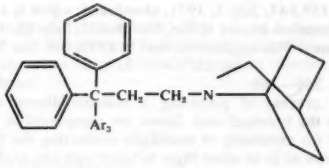
3,998,832

ANTI-DIARRHEAL COMPOUNDS

Gilbert W. Adelstein, Evanston; Esam Z. Dajani, Buffalo Grove, and Chung Hwai Yen, Skokie, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Apr. 16, 1975, Ser. No. 568,439
Int. Cl.² C07D 401/02
U.S. Cl. 260—293.54 5 Claims

1. A compound of the formula



and the pharmaceutically acceptable acid addition salts thereof wherein Ar_3 is phenyl or pyridyl.

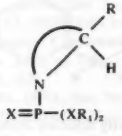
3,998,833

DIELS-ALDER ADDUCTS OF DIHYDRO-NITROGEN HETEROCYCLIC PHOSPHORAMIDATES

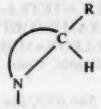
Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 210,106, Dec. 20, 1971, Pat. No. 3,821,232. This application Mar. 19, 1974, Ser. No. 452,645
Int. Cl.² C07D 471/04
U.S. Cl. 260—293.55 S 10 Claims

1. A Diels-Alder Adduct of a dihydro-nitrogen heterocyclic phosphoramidate of the formula



with a dienophile where



represents a 1,2-dihydro-2-R-pyridinyl or lower alkyl substituted 1,2-dihydro-2-R-pyridinyl, R and R_1 are lower alkyl or phenyl and X is O or S, said dienophile being of the formula

$CH_2 = CHA$, where A represents CHO, CO_2H, CO_2CH_3, $CO_2C_2H_5$, COCl, $COCH_3$, COC_6H_5, CN, NO_2, C_6H_5, CH_2OH, CH_2Z, CH_2NH_2, CH_2CN, CH_2CO_2H, CH_2NCS, $OCOCH_3$, $SC_6H_4CH_3$, Z or H,

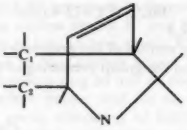
$C_6H_5CH = CHA$, where A represents CHO, CO_2H, CO_2CH_3, $CO_2C_2H_5$, $COCH_3$, COC_6H_5,

$CH_2 = CA_2$, where A represents $CO_2C_2H_5$, CN, $COCH_3$, Z,

ACH = CHA, where A represents CO_2H, COCl, CO_2CH_3, $CO_2C_2H_5$, $COCH_3$, COC_6H_5, Z, Quinone,

AC CA, where A represents CO_2H, CO_2CH_3, $CO_2C_2H_5$, COC_6H_5, C_6H_5, H,

and where Z represents halogen, or said dienophile is crotonaldehyde, dibenzalacetone, 1-cyclopentene-3-one, 1-cyclohexene-3-one, crotonic acid, crotonyl chloride, 3,4-dihydro-1-naphthoic acid, coumarin, beta-naphthol (as keto tautomer), cyclopentadiene, 1,3-cyclohexadiene, acenaphthylene, 4-vinyl-1-cyclohexene, 1-methyl-1-cyclopentene, dicyclopentadiene, maleic anhydride, or N-phenyl maleimide, and where said Diels-Alder Adduct is characterized by having the following structure in the adduct



the carbons C_1 and C_2 being carbons of an unsaturated carbon to carbon bond of said dienophile and the atoms of the 6 membered ring of said structure containing nitrogen and the indicated double bond being the atoms of the 1,2-dihydropyridine group and the free valences of said structure being attached to atoms of said Diels-Alder Adduct.

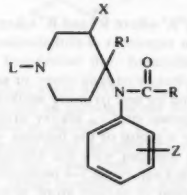
3,998,834

N-(4-PIPERIDINYL)-N-PHENYLAMIDES AND -CARBAMATES

Paul Adriaan Jan Janssen, Vosselaar, and Georges Henri Paul Van Daele, Turnhout, both of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 558,511, March 14, 1975, abandoned. This application Jan. 13, 1976, Ser. No. 648,685
Int. Cl.² C07D 401/12, 417/12, 405/12, 211/58
U.S. Cl. 260—293.68 17 Claims

1. A chemical compound selected from the group consisting of a piperidine derivative having the formula:



and the pharmaceutically acceptable acid addition salts and stereochemical optical isomeric forms thereof, wherein:

Z is a member selected from the group consisting of hydrogen, halo, lower alkyl, lower alkyloxy and trifluoromethyl;

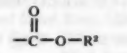
L is a member selected from the group consisting of alkyl having from 3 to about 10 carbon atoms, cycloalkylmethyl wherein the cycloalkyl group has 3 to 6 carbon atoms, 2-arylethyl, 2-aryl-1-methylethyl, 2-aryl-2-hydroxyethyl, 2-aryl-2-hydroxy-1-methylethyl, 1-(arylcarbonyl-)ethyl, 3-arylpropyl, 2-(arylamino)ethyl, 2-aryl-2-(lower alkylcarbonyloxy)ethyl, 2-aryl-2-(lower alkylcarbonyloxy)-1-methylethyl, 2-[aryl(lower alkylcarbonyl-)amino]ethyl, 4-phenylcyclohexyl, 2,3-dihydro-1H-inden-2-yl, and lower alkenyl; said "aryl" being a member selected from the group consisting of phenyl, halophenyl, lower alkylphenyl, lower alkyloxyphenyl, (trifluoromethyl)phenyl, nitrophenyl, aminophenyl, naphthalenyl, pyridinyl, 2-furanyl, 2-thienyl, and 1-methyl-1H-pyrrol-2-yl;

X is a member selected from the group consisting of hydrogen and methyl;

R is a member selected from the group consisting of lower alkyl, lower alkyloxy and cycloalkyl having 3 to 6 carbon atoms; and

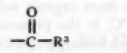
R^1 is a member selected from the group consisting of

a. a carboxylate radical represented by the formula



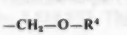
wherein R^2 is selected from the group consisting of lower alkyl, lower alkenyl and phenylmethyl;

b. an alkanoyl radical represented by the formula



wherein R^3 is lower alkyl; and

c. an oxymethyl radical represented by the formula



wherein R^4 is selected from the group consisting of hydrogen, lower alkyl, phenylmethyl and lower alkylcarbonyl;

provided that:

i. when said R^2 is phenylmethyl, or when said R^4 is a member selected from the group consisting of phenylmethyl and lower alkylcarbonyl, then said L is selected from the group consisting of alkyl, cycloalkylmethyl wherein the cycloalkyl group has 3 to 6 carbon atoms, 2-arylethyl, 2-aryl-1-methylethyl, 1-(arylcarbonyl)-ethyl, 3-arylpropyl, 2-aryl-2-(lower alkylcarbonyloxy)-ethyl, 2-aryl-2-(lower alkylcarbonyloxy)-1-methylethyl, 4-phenylcyclohexyl, 2,3-dihydro-1H-inden-2-yl, and lower alkenyl; and

ii. when said R^4 is hydrogen then said L is other than 2-[aryl(lower alkylcarbonyl)amino]ethyl.

2. A compound selected from the group consisting of N-4-(methoxymethyl)-1-[2-(2-thienyl)ethyl]-4-piperidinyl-N-phenylpropanamide and the pharmaceutically acceptable acid addition salts thereof.

3,998,835
1-SUBSTITUTED AMINO-3-THIENO-[3,2-c]PYRIDINYLOXY-2-PROPANOLS

Fran Troxler, and Erik Wiskott, both of Bottmingen, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

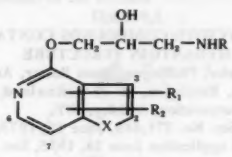
Filed Aug. 20, 1975, Ser. No. 605,972

Claims priority, application Switzerland, Apr. 8, 1975, 4432/75

Int. Cl.² C07D *417/00*

U.S. Cl. 260—294.8 C **41 Claims**

1. A racemic or optically active compound of formula I,



I

wherein

X is sulphur,

R is alkyl of 3 to 7 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, cycloalkyl of 3 to 7 carbon atoms monosubstituted y alkyl of 1 to 4 carbon atoms, α-dialkylpropinyl of 5 to 9 carbon atoms or α-dialkyl-allyl of 5 to 9 carbon atoms, hydroxyalkyl of 2 to 7 carbon atoms or phenoxyalkyl of 8 to 11 carbon atoms, the oxygen atom of the last two radicals being separated by at least two carbon atoms from the nitrogen atom to which R is bound,

R_1 is

i. hydrogen or alkyl of 1 to 4 carbon atoms, in the 2,3,6 or 7 position, or

ii. chlorine or bromine, in the 2, 3 or 7 position,

iii. nitro or —NHA wherein A is alkanoyl of 1 to 4 carbon atoms, in the 2, 3 or 7 position, or

iv. fluorine, cyano or COOB, wherein B is alkyl of 1 to 4 carbon atoms, in the 2 or 3 position, and

R_2 is

i. hydrogen or alkyl of 1 to 4 carbon atoms in the 2, 3, 6 or 7 position,

ii. chlorine or bromine, in the 2, 3 or 7 position, or

iii. fluorine in the 2 or 3 position,

or a pharmaceutically acceptable acid addition salt thereof.

3,998,836
KETIMINE DERIVATIVES AND PROCESS FOR PRODUCING THE SAME

Yozo Ohtsuka, Sagamihara, Japan, assignor to Sagami Chemical Research Center, Tokyo, Japan

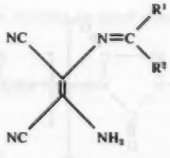
Filed Aug. 12, 1974, Ser. No. 496,685

Claims priority, application Japan, Aug. 10, 1973, 48-89326

Int. Cl.² C07D *273/84, 307/66, 333/36;* C07C *121/20*

U.S. Cl. 260—294.9 **15 Claims**

1. A compound represented by the formula



(I)

wherein R^1 represents a substituted or unsubstituted aromatic ring selected from the group consisting of phenyl, naphthyl, styryl and a heterocyclic group selected from the group consisting of thiophene, furan and pyridine and R^2 represents an alkyl group having 1 to 8 carbon atoms or a substituted or

unsubstituted aromatic ring selected from the group consisting of phenyl, naphthyl, styryl and a heterocyclic group selected from the group consisting of thiophene, furan and pyridine, or R^1 and R^2 may form, when taken together with the carbon atom to which they are attached, a fluorenylidene or indenylidene group, said substituent on the aromatic ring being an alkyl group having 1 to 8 carbon atoms, a nitro group or a hydroxy group.

11. 2-Amino-3-[1-(3-pyridyl)-ethylideneamino]maleonitrile according to claim 1.

3,998,837

POLYGLYCIDYL COMPOUNDS CONTAINING HYDANTOIN STRUCTURE

Jurgen Habermeier, Pfeffingen; Hans Batzer, Arlesheim, and Daniel Porret, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

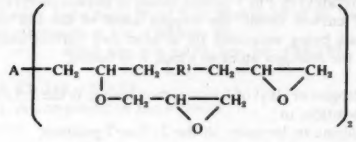
Division of Ser. No. 371,449, June 19, 1973, Pat. No. 3,900,493. This application June 26, 1975, Ser. No. 590,550

Claims priority, application Switzerland, June 23, 1972, 9528/72

Int. Cl.² C07D 405/14

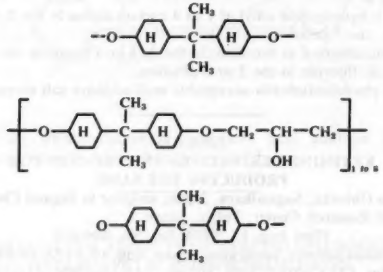
U.S. Cl. 260—309.5 2 Claims

1. A polyglycidyl compound of the formula

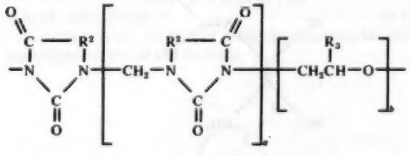


(I)

wherein A denotes one of the radicals of the formulae



R^1 denotes a divalent radical of the formula

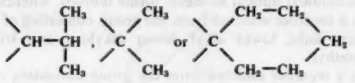


(II)

wherein *a* and *b* are identical or different and denote either 0 or 1;

R^3 is hydrogen or methyl;

and R^2 denotes one of the radicals



3,998,838

COMPLEXES OF MACROCYCLIC POLYETHER WITH MERCAPTOIMIDAZOLINES

Charles John Pedersen, Salem, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 93,424, Nov. 27, 1970, Pat. No. 3,873,569. This application Nov. 5, 1974, Ser. No. 521,025

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07D 49/34

U.S. Cl. 260—309.6 5 Claims

1. A complex of (A) a member of the group consisting of mercaptoimidazolines, and (B) a macrocyclic polyether having a macrocyclic ring of carbon and oxygen atoms totaling 15–60 ring atoms, each oxygen in the ring being separated from its adjoining oxygens in the ring by 2 or 3 carbon atoms, and the macrocyclic ring being fused by a pair of vicinal carbon atoms to 1–4 carbocyclic rings of the group: (a) phenylene, naphthylene, phenanthrylene, and anthrylene, (b) saturated analogs of (a), and (c) monosubstituted derivatives of (a) wherein the substituent is tertiary butyl.

3,998,839

PROCESS FOR THE PREPARATION OF METAL-FREE PHTHALOCYANINE

Zdenek Seha, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 19, 1973, Ser. No. 426,266

Claims priority, application Switzerland, Dec. 28, 1972, 19002/72

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C09B 47/08

U.S. Cl. 260—314.5 5 Claims

1. A one-step process for the preparation of metal-free phthalocyanine consisting essentially of reacting phthalonitrile with anhydrous alkali sulfide in an inert organic solvent having a boiling point higher than 130°C, in the presence of 0.5 to 3 equivalents of an alcohol having a boiling point higher than 130°C, at a temperature of between 100°C and the boiling point of the solvent and alcohol, wherein said reactants are in the ratio of 4 moles of phthalonitrile to 0.05–0.3 moles of alkali sulfide.

3,998,840

METHOD FOR MAKING POLYETHERIMIDES USING A SODIUM CHLORIDE OR FERRIC SULFATE CATALYST

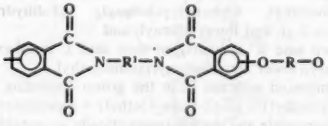
Frank J. Williams, III, Scotia, and Howard J. Klopfer, Elnora, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,773

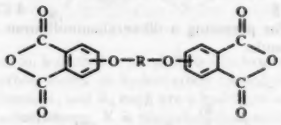
Int. Cl.² C07D 209/48; C08G 20/32; C08F 11/04

U.S. Cl. 260—326 N 7 Claims

1. A method for making polyetherimides consisting essentially of chemically combined units of the formula



where R is a divalent aromatic organic radical having from 6–30 carbon atoms, R^1 is a divalent organic radical selected from R radicals, alkylene radicals having from 2–20 carbon atoms, cycloalkylene radicals, and $C_{(2-8)}$ alkylene terminated polydiorganosiloxane radicals, which comprises effecting the reaction under melt polymerization conditions between an aromatic bis(ether anhydride) of the formula



and an organic diamine of the formula

$$H_2NR^1NH_2$$

in the presence of a metal catalyst selected from the class consisting of sodium chloride and ferric sulfate.

3,998,841

CHLOROTHIO-N-PHTHALIMIDE AND PROCESS THEREFOR

Rüdiger Schubart, Cologne; Manfred Blazejak, Duesseldorf, and Ernst Roos, Odenthal-Osenau, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 7, 1974, Ser. No. 477,546

Claims priority, application Germany, June 14, 1973, 2330241

Int. Cl.² C07D *209/34*

U.S. Cl. 260—326 S **1 Claim**

1. Chlorothio-N-phthalimide.

3,998,842

DIAZEPINO[1,2-α]INDOLES

Alan Chapman White, Windsor, and Robin Michael Black, Iver Heath, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

Continuation-in-part of Ser. No. 313,232, Dec. 8, 1972, Pat. No. 3,850,957. This application July 22, 1974, Ser. No. 490,812

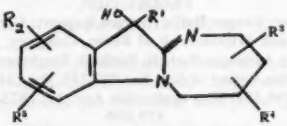
Claims priority, application United Kingdom, Dec. 14, 1971, 1250/71

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C07D *243/04*

U.S. Cl. 260—326.5 B **5 Claims**

1. A compound selected from the group consisting of bases having the formula:



and the acid addition salts of said bases with pharmaceutically acceptable acids, wherein R^1 represents a member of the group consisting of phenyl, halophenyl, lower alkyl phenyl, lower alkoxy phenyl, dihalophenyl and trifluoromethylphenyl; and R^2 is halogen or hydrogen.

3,998,843

QUATERNARY AMMONIUM COMPOUNDS

John William Lewis, N. Ferriby, and Michael John Readhead, Hull, both of England, assignors to Reckitt & Colman Products Limited, England

Filed June 4, 1973, Ser. No. 366,604

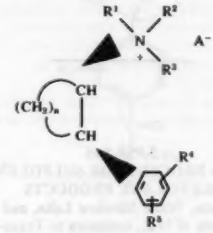
Claims priority, application United Kingdom, June 7, 1972, 26603/72

The portion of the term of this patent subsequent to Aug. 12, 1992, has been disclaimed.

Int. Cl.² C07D *207/06, 207/08*

U.S. Cl. 260—326.41 **13 Claims**

1. A compound of the formula



I

wherein *n* is an integer of from 3 to 5 inclusive; R^1 is alkyl of from 1 to 3 carbon atoms inclusive; R^4 is selected from the group consisting of hydrogen, and at the 3 position hydroxy, chlorine, and the group OR^6 where R^6 is selected from the group consisting of acetyl, propionyl, butyryl, dimethylcarbamoyl, diethylcarbamoyl and diphenylcarbamoyl; R^5 is hydrogen or when R^4 is hydroxy R^5 may additionally be hydroxy at the 6 position; NR^2R^3 is selected from the group consisting of pyrrolidino and when R^4 is hydroxy, NR^2R^3 may additionally be dimethylamino or diethylamino; and A is a pharmaceutically acceptable anion.

3,998,844

UNCATALYZED AROYLATION OF 1-ALKYLPYRROLE-2-ACETIC ACID DERIVATIVES

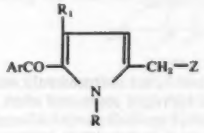
John Robert Carson, Norristown, Pa., assignor to McNeil Laboratories, Incorporated, Ft. Washington, Pa.

Filed June 2, 1975, Ser. No. 583,065

Int. Cl.² C07D *207/32*

U.S. Cl. 260—326.47 **11 Claims**

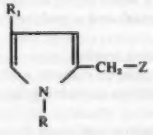
1. The process of preparing 5-aroyl-1-loweralkylpyrrole-2-acetic acid derivatives of the formula:



which comprises reacting an aroyl chloride of the formula:

ArCOCl

with a pyrrole of the formula:



in an aprotic solvent in the absence of catalyst, wherein the foregoing formulas R is loweralkyl, R_1 is a member selected from the group consisting of hydrogen and loweralkyl, Z is a member selected from the group consisting of CN and COO(-loweralkyl), and Ar is a member selected from the group consisting of phenyl, thienyl, nitrophenyl, methylthiophenyl, trifluoromethylphenyl and phenyl substituted with from one to three substituents each selected from the group consisting of loweralkyl, loweralkoxy and halo and wherein said reaction is carried out at a temperature in the range of from ambient temperature to the refluxing temperature of the solvent, provided that when R_1 in the reactant pyrrole is hydrogen, the reaction temperature is at least 50° C.

3,998,845

EMULSION PROCESS FOR SULFOLENE AND SULFOLANE PRODUCTS

Herbert J. Goldstein, White Meadow Lake, and Hsiao-Jun Li, Morristown, both of N.J., assignors to Texas-U.S. Chemical Company, Parsippany, N.J.

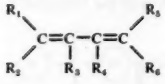
Continuation-in-part of Ser. No. 192,634, Oct. 26, 1971, Pat. No. 3,822,286, which is a continuation-in-part of Ser. No. 825,385, May 16, 1969, abandoned. This application June 14, 1974, Ser. No. 479,489

Int. Cl.² C07D *333/48*

U.S. Cl. 260—332.1 **9 Claims**

1. A method for the preparation of sulfolene compounds by direct condensation of conjugated dienes with sulfur dioxide which comprises the steps of:

1. selecting a quantity of water for the reaction, and treating said water to render it nonoxygenating by dissolving in said water an antioxidant selected from the group consisting of alkyl mercaptans and thiophenol; inorganic salts or inorganic lower valence sulfur containing acids, and inorganic salts of inorganic lower valence phosphorus acids;
2. dispersing in said water a conjugated diene monomer corresponding to the formula



wherein R_1, R_3, R_3, R_4, R_5, and R_6 are independently selected from the group consisting of hydrogen atoms and alkyl, alkenyl, aryl, alkoxy, alkaryl, aralkyl, cycloalkyl, cycloalkenyl and halogen radicals; in an amount from 5 to 170% of the weight of the water medium;

3. adding to said diene in water dispersion from 6–190% of sulfur dioxide, as based on the weight of water, at a pressure of 60–550 pounds per square inch and a temperature of from 60°–150° C, for 1 to 5 hours to react said sulfur dioxide with said diene dispersion and to produce thereby a reaction mixture comprising a water slurry containing a solution of a sulfolene compound and a polymeric sulfone;
4. dropping the pressure to ambient levels;
5. filtering said hot reaction mixture to remove said polymeric polysulfone from said solution containing the sulfolene compound; and
6. cooling said solution to precipitate sulfolene therefrom and removing the resulting crystals from said solution.

3,998,846

PROCESS FOR PREPARING DIBENZYLAMINO FLUORAN COMPOUNDS

Mutsuo Terayama, and Kenji Yamamoto, both of Yao, Japan, assignors to Yamamoto Kagaku Gosei Kabushiki Kaisha, Oosaka, Japan

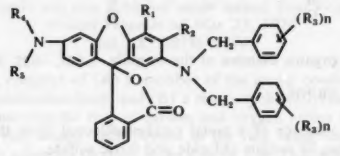
Division of Ser. No. 123,069, March 10, 1971, Pat. No. 3,839,361. This application Mar. 11, 1974, Ser. No. 450,167

Claims priority, application Japan, July 8, 1970, 45-59711

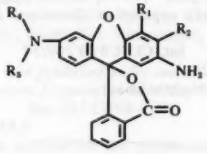
Int. Cl.² C07D *493/10*

U.S. Cl. 260—335 **4 Claims**

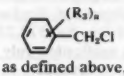
1. A process for preparing a dibenzylaminofluoran compound of the formula:



wherein R_1 and R_2 are individually members selected from the group consisting of hydrogen, chlorine, bromine, and methyl; R_3 is a member selected from the group consisting of hydrogen, chlorine, bromine, and C_{1-4} lower alkyl; R_4 and R_5 are individually members selected from the group consisting of methyl and ethyl; and *n* is an integer of from 1 to 5, comprising the step of reacting an amino fluoran compound of the formula:



wherein R_1, R_2, R_4 and R_5 are as defined above, with a benzyl chloride of the formula:



wherein R_3 and *n* are as defined above, in a non-polar solvent and in the presence of a solid alkali selected from the group consisting of potassium carbonate, sodium carbonate, caustic potash and caustic soda.

3,998,847

9,10-SECOESTRANE DERIVATIVES AND THEIR PRODUCTION

Ulrich Eder; Gregor Haffer; Jurgen Ruppert; Gerhard Sauer, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

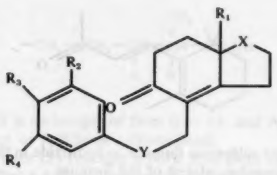
Continuation-in-part of Ser. No. 409,235, Oct. 24, 1973, Pat. No. 3,890,391. This application Apr. 21, 1975, Ser. No. 570,090

Claims priority, application Germany, Oct. 25, 1972, 2253089

Int. Cl.² C07D *317/46*

U.S. Cl. 260—340.5 **5 Claims**

1. A 9,10-secoestrane of the formula



wherein R_1 is methyl or ethyl; R_4 is a hydrogen atom, alkoxy of 1–4 carbon atoms, or hydrocarbon carbonyloxy of 1–12 carbon atoms; R_2 and R_3 each are a hydrogen atom or alkoxy of 1–4 carbon atoms; X is phenylenedioxymethylene; and Y is carbonyl or dialkoxymethylene.

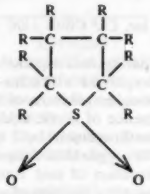
3,998,848

CYCLODIMERIZATION OF ETHYLENE OXIDE

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 3, 1975, Ser. No. 619,322
Int. Cl.² C07D *319/10*
U.S. Cl. 260—340.6 **5 Claims**

1. A process for the cyclodimerizaton of ethylene oxide which comprises reacting ethylene oxide in the presence of a catalytic amount of a catalyst system consisting of elemental iodine in a sulfolane having from 4 to 7 carbon atoms per molecule corresponding to the formula



wherein each R is individually selected from the group consisting of hydrogen and alkyl having from 1 to 3 carbon atoms.

3,998,849

2α-(2-CARBOXY-2-FORMYLETHYL)-3β-HYDROXY-5-OXO-1β-CYCLOPENTANEHEPTANOIC ACID AND PROCESS

Norman L. Wendler, Summit; David Taub, Metuchen; Harry L. Slates, Westfield, and Zbigniew S. Zelawski, Piscataway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 435,812, Jan. 23, 1974, Pat. No. 3,915,994, which is a division of Ser. No. 201,979, Nov. 24, 1971, Pat. No. 3,833,612. This application May 8, 1975, Ser. No. 575,676
Int. Cl.² C07D *317/72*
U.S. Cl. 260—340.9 **3 Claims**

1. 2α-(2-Carboxy-2-formylethyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid, δ-lactone, 5-cyclic ethylene acetal, and stereoisomers and loweralkyl, benzyl, or xylyl esters thereof.

3. The process for the preparation of the compound of claim 1 which comprises reacting the lower-alkyl or aralkyl ester of 2α-(2-Carboxyethyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid, δ-lactone 5-cyclic ethylene acetal with a loweralkyl formate in the presence of an alkali metal hydride.

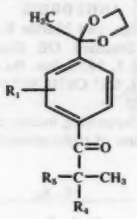
3,998,850

SUBSTITUTED-4'-AMINOACETYL ALKANOYLPHENONES

William J. Houlihan, Mountain Lakes, and Jeffrey Nadelson, Lake Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 403,009, Oct. 3, 1973, Pat. No. 3,873,539. This application Jan. 8, 1975, Ser. No. 539,352
Int. Cl.² C07D *317/10*
U.S. Cl. 260—340.9 **1 Claim**

1. A compound of the formula



where

R_1 represents hydrogen, halo having an atomic weight of about 19 to 36, or straight chain lower alkoxy, and

R_4 and R_5 each independently represent alkyl having 1 to 2 carbon atoms.

3,998,851

PREPARATION OF COUMARINS

Paul H. Reichenbacher, Schaumburg; Theresa M. Forsythe, Mount Prospect, and Allen K. Sparks, Woodstock, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 358,197, May 7, 1973, abandoned. This application June 30, 1975, Ser. No. 591,994
Int. Cl.² C07D *311/10*
U.S. Cl. 260—343.2 R **11 Claims**

1. A process for the preparation of a coumarin which comprises contacting a reactant consisting essentially of an o-hydroxycinnamate, an o-hydroxycinnamic acid or a mixture thereof with a solid or dissolved catalyst containing a metal of Group VIII of the Periodic Table at a temperature in the range of from about 25° to about 200° C. and a pressure in the range of from about atmospheric to about 100 atmospheres, and recovering the resultant coumarin.

3,998,852

NOVEL PROSTAGLANDIN INTERMEDIATES AND PROCESS FOR THE PRODUCTION THEREOF

Francisco S. Alvarez, Sunnyvale, and Albert R. Van Horn, Menlo Park, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 351,312, April 16, 1973, Pat. No. 3,886,185. This application Jan. 15, 1975, Ser. No. 541,188
Int. Cl.² C07D *309/22*
U.S. Cl. 260—345.8 **5 Claims**

1. A compound selected from the group consisting of (dl)-2α-(2-acetoxyethyl)-3β-(3S-hydroxy-trans-1-octenyl)-4α-tetrahydropyranyloxy-1-oxocyclopentane,

(dl)-2α-(2acetoxyethyl)-3β-(3R-hydroxy-trans-1-octenyl)-4α-tetrahydropyranyloxy-1-oxocyclopentane,

(dl)-2α-(2-acetoxyethyl)-3β-(3R-mesyloxy-trans-1-octenyl)-4α-tetrahydropyranyloxy-1-oxocyclopentane, and the optically active

2α-(2-acetoxyethyl)-3β-(3S-hydroxy-trans-1-octenyl)-4α-tetrahydropyranyloxy-1-oxocyclopentane.

3,998,853
13-OXATETRACYCLO[8.2.1^{2,9}.0^{3,8}]TRIDEC-5-ENE-1,5,6,10-TETRACARBONITRILE

Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1975, Ser. No. 637,500
Int. Cl.² C07D *307/77*
U.S. Cl. 260—346.2 M **1 Claim**

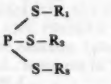
1. 13-Oxatetracyclo[8.2.1^{2,9}.0^{3,8}]tridec-5-ene-1,5,6,10-tetracarbonitrile.

3,998,854
TRITHIOPHOSPHITE STABILIZED MALEIC ANHYDRIDE

Cecelia Samans, Chicago, and Martin R. Spatz, Lisle, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Aug. 7, 1975, Ser. No. 602,681
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.8 M **5 Claims**

1. A composition comprising maleic anhydride and a heat stabilizing concentration of trithiophosphite having the structure



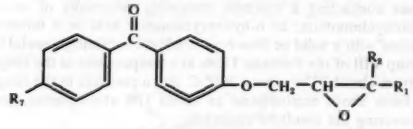
wherein R_1, R_2, and R_3 are independently alkyl groups of 1 to 24 atoms, aryl groups of 6–24 carbon atoms, aralkyl groups containing 7 to 25 carbon atoms and alkenyl groups containing 8 to 24 carbon atoms.

3,998,855
EPOXYALKOXY SUBSTITUTED BENZOPHENONES

Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 321,625, Jan. 8, 1973, abandoned. This application July 1, 1974, Ser. No. 484,724
Claims priority, application Switzerland, Jan. 14, 1972, 523/72; Dec. 13, 1972, 18174/72
Int. Cl.² C07D *303/32*
U.S. Cl. 260—348 R **4 Claims**

1. A compound of the formula



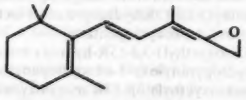
wherein R_1 represents alkyl with 1 to 4 carbon atoms, R_2 represents hydrogen, methyl or ethyl and R_7 represents hydrogen or methyl.

3,998,856
PREPARATION OF EPOXIDES

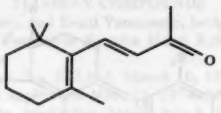
Michael Rosenberger, Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 10, 1975, Ser. No. 566,893
Int. Cl.² C07D *301/02*
U.S. Cl. 260—348 R **4 Claims**

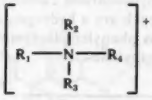
1. A process for producing an epoxide of the formula:



comprising reacting in a two phase system containing an inert organic solvent phase and an aqueous phase, a ketone of the formula:



with trimethyl sulfonium fluoride or hydroxide in the presence of a phase transfer catalyst of the formula:



wherein R_1, R_2, R_3 and R_4 are benzyl or alkyl and Y is a chloride, fluoride or hydroxide;
with said aqueous phase containing a base selected from the group consisting of an alkali metal or a quaternary ammonium hydroxide.

3,998,857
PROCESS FOR PREPARING ANTHRAQUINONE

Hermann Oediger, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 9, 1975, Ser. No. 594,485
Claims priority, application Germany, Aug. 2, 1974, 2437220
Int. Cl.² C09B *1/00*
U.S. Cl. 260—369 **10 Claims**

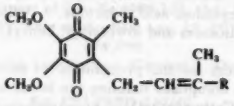
1. Process for preparing anthraquinones which comprises reacting a 1,4-naphthoquinone with trans-1-acetoxybutadiene in a polar solvent at a temperature of from 30° to 60° C, optionally in the presence of acetic acid, to give 1-acetoxy-1,4,4a,9a-tetrahydroanthraquinone and treating the reaction solution obtained with oxygen at a temperature of from 100° to 130° C without isolation of said 1-acetoxy-1,4,4a,9a-tetrahydroanthraquinone, after addition of a salt of acetic acid or of a compound which forms an acetic acid salt under the reaction conditions, about 0.03 to 0.06 mol of the acetic acid salt or compound which forms such salt being added per mol of naphthoquinone.

3,998,858
PROCESS FOR SYNTHESIS OF COENZYMES Q

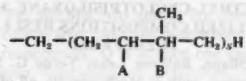
Shizumasa Kijima; Isao Yamatu, both of Tokyo; Kimio Hamamura, Kashiwa; Norio Minami, Kawasaki; Youji Yamagishi, and Yuichi Inai, both of Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Dec. 12, 1975, Ser. No. 640,305
Int. Cl.² C07C *49/73*
U.S. Cl. 260—396 R **6 Claims**

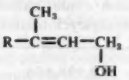
1. A process for the synthesis of 2,3-dimethoxy-5-methyl-6-substituted-1,4-benzoquinones having the formula:



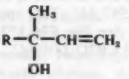
wherein R is a group of the formula:



in which S is an integer of from 0 to 11, and A and B are hydrogen or A-B form a direct bond,
which comprises (a) reacting a boric acid ester of 2,3-dimethoxy-5-methyl-1,4-benzohydroquinone with a prenol having the formula:



wherein R is as defined above, or an isoprenol having the formula:



wherein R is as defined above or a reactive derivative thereof selected from the group consisting of lower alkyl ethers, esters and halides, to thereby form a boric acid ester of 2,3-dimethoxy-5-methyl-6-substituted-1,4-benzohydroquinone and (b) reacting the thus formed borate with a mild oxidant.

3,998,859

INTRODUCING Δ^{11} UNSATURATION INTO STEROID COMPOUNDS

Chin Hsin Chen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 18, 1975, Ser. No. 597,119
Int. Cl.² C07J *7/00, 9/00*
U.S. Cl. 260—397.1 **15 Claims**

1. A process for providing Δ^{11} unsaturation in a steroid compound having a C-12 sulfonate ester group comprising removal of said sulfonate ester group by treating said steroid compound with a hexaalkylphosphoric triamide.

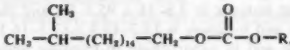
3,998,860

SOLIDIFICATION RETARDATION OF LIQUID CRYSTALLINE COMPOSITIONS WITH STEROID DERIVATIVES OF ISOSTEARYL CARBONATE

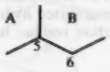
George T. Brown, Jr., Dayton; Donald B. Clark, Kettering, and Donald E. Koopman, Miami Township, all of Ohio, assignors to Djinnii Industries, Inc., Dayton, Ohio

Division of Ser. No. 500,671, Aug. 26, 1974, Pat. No. 3,920,574. This application July 31, 1975, Ser. No. 600,842
Int. Cl.² C07J *9/00*
U.S. Cl. 260—397.2 **12 Claims**

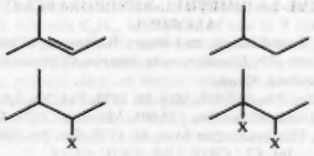
1. A composition of matter for use in retarding solidification of liquid crystalline compositions comprising of about 20–90 weight per cent cholesteryl pelargonate, about 0–50 weight per cent cholesteryl oleyl carbonate, about 0–1.8 weight per cent cholesteryl chloride and a compound having the formula



wherein R is a derivative of a steroid group selected from the group consisting of cholesterol, stigmasterol and sitosterol; and where the chemical bond linkage of carbon 5 to 6



of said steroid group is selected from a group consisting of



X being a halogen.

3,998,861

PREPARATION OF OMEGA-CARBOXYALKANOHYDROXAMIC ACIDS

Mahmoud S. Kablaoui, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed June 23, 1975, Ser. No. 589,330
Int. Cl.² C08K *5/29, 5/33;* **C07C** *101/30*
U.S. Cl. 260—404 **18 Claims**

1. A method of preparing an omega-carboxyalkanohydroxamic acid which comprises contacting at a temperature of about 60° to 200° C an ammonium, Group IA or Group IIA metal salt of a cyclic alpha-nitroketone with an acidic mineral acid salt which is ammonium chloride, ammonium nitrate, ammonium sulfate, ammonium hydrogen sulfate, aluminum nitrate, aluminum sulfate, ferric chloride, cupric nitrate, zinc sulfate or calcium nitrate, in the presence of a monocarboxylic acid solvent having from 1 to 16 carbon atoms.

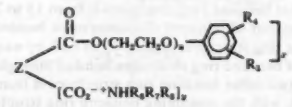
3,998,862

ALKYL AMMONIUM CARBOXYLITE SALT-ETHOXYLATED ALKYL PHENOL ESTERS

Robert R. Kuhn, Lansdale, and Warren H. Machleder, Bluebell, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation of Ser. No. 379,670, July 16, 1973, Pat. No. 3,912,771. This application Mar. 11, 1975, Ser. No. 557,435
Int. Cl.² C09F *5/00, 7/00;* **C11C** *3/00*
U.S. Cl. 260—404.5 **6 Claims**

1. As a new composition of matter, surface active alkyl ammonium carboxylate salt-ethoxylated alkyl phenol ester of a trimer or dimer acid of the formula



where n is an average number from about 1 to 12.5; and wherein in the case of the salt-ester derived from a trimer acid
x is an average number of from about 1 to 2, and
y is an average number of from about 1 to 2, the sum of x and y being 3;
and in the case of the salt-ester derived from a dimer acid, both x and y are each on the average 1, the sum of x and y being 2;
R_4 is an alkyl group containing 4 to 12 carbon atoms;
R_5 is H or an alkyl group containing 4 to 12 carbon atoms;

R_6 is an alkyl group containing 1 to 24 carbon atoms which may be straight or branched chain or an amine substituted alkyl group of 2 to 24 carbon atoms; R_7 is H or is the same as R_6, R_8 is H or is the same as R_6; and

Z is a saturated or unsaturated hydrocarbon residue of the acid, said hydrocarbon residue having 34 to 51 carbon atoms.

3,998,863

ESTERS OF 4-ALKYL-2,6-DIMETHYL-3-HYDROXYBENZYL ALCOHOL

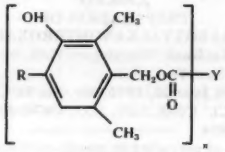
John Song, Bound Brook, and Henry Richmond, Whitehouse Station, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 363,439, May 24, 1973, Pat. No. 3,923,869, which is a division of Ser. No. 123,001, March 10, 1971, Pat No. 3,795,700. This application Mar. 21, 1975, Ser. No. 560,848

Int. Cl.² C09F *5/08*; C07C *69/34*

U.S. Cl. 260—410.5 **4 Claims**

1. A compound of the formula:



wherein R is a branched chain alkyl group containing three to about twelve carbon atoms; *n* is one to four; and Y is the residue of a carboxylic acid $Y(COOH)_n$ selected from the group consisting of stearic acid, lauric acid, myristic acid, palmitic acid, eicosanoic acid, oleic acid, linoleic acid, hexahydrophthalic acid, adipic acid, oxalic acid, malonic acid, succinic acid, glutaric acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, maleic acid, fumaric acid, itaconic acid, tricarballylic acid, and aconitic acid.

3,998,864

HETEROGENEOUS CATALYST FOR THE HYDROFORMYLATION OF OLEFINS

Alvin E. Trevillyan, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Feb. 3, 1975, Ser. No. 546,323

Int. Cl.² C07F *15/06*

U.S. Cl. 260—439 R **2 Claims**

1. A composition which comprises a polyphenylene containing benzene ring structures bonded into a polymer chain wherein the amount of benzene ring structures bonded to three or more other benzene ring structures is from 15 to 25% by weight, the amount of benzene ring structures bonded to two other benzene ring structures is from 45 to 65% by weight, and the amount of benzene ring structures bonded through the meta position to two other benzene ring structures is from 15 to 30% by weight, with the remaining benzene ring structures being bonded to only one other benzene ring structure, said polyphenylene having a number average molecular weight in the range of about 1000 to about 10000, said polyphenylene having $-PR_2$ substituents, where R is a phenyl or alkyl group, in amounts such that the ratio of phenyl groups to phosphorus atoms is in the range of about 1.0 to about 20, said $-PR_2$ groups being complexed with a metal carbonyl compound selected from the group consisting of cobalt, rhodium, ruthinium, osmium, irridium, and iron carbonyls in amounts such that the ratio of phosphorus atoms to metal atoms is in the range of from about 1 to about 20.

3,998,865

PROCESS FOR THE STABILIZATION OF HEXAMETHYL-CYCLOTRISILOXANE AND THE STABILIZED COMPOSITIONS RESULTING THEREFROM

George R. Siciliano, Ballston Lake; Verne G. Simpson, and James J. Finigan, both of Mechanicville, all of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Mar. 12, 1975, Ser. No. 557,604

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 S **22 Claims**

1. A process for stabilizing hexamethylcyclotrisiloxane, said process comprising intimately admixing an effective stabilizing amount of an alkaline earth oxide selected from the group consisting of magnesium oxide, calcium oxide and barium oxide with said hexamethylcyclotrisiloxane.

3,998,866

THIOETHER PROPYL ISOCYANATES

Alexis A. Oswald, Mountainside, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 107,474, Jan. 18, 1971, Pat. No. 3,884,951, which is a division of Ser. No. 759,200, Sept. 11, 1968, Pat. No. 3,597,341. This application May 9, 1975, Ser. No. 576,177

Int. Cl.² C07C *119/042*, *119/045*

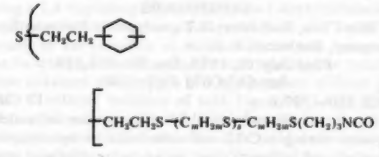
U.S. Cl. 260—453 A **2 Claims**

1. Triisocyanate compounds of the formula

$$R''-[SCH_2-CH_2-CH_2-N=C=O]_3$$

wherein R'' is a trivalent hydrocarbon radical selected from the group consisting of C_3 to C_{20} alkanes, C_6 to C_7 cycloalkanes, C_6 to C_{200} aliphatic hydrocarbon radicals interrupted by S in such a manner as to obtain a minimum of two adjacent carbon atoms between sulfur atoms.

2. Tetraisocyanate compounds of the formula



wherein *m* is 2 to 4; *s* is 0 to 20 and the thioether groups are separated by at least 2 carbon atoms.

3,998,867

PROCESS FOR THE SIMULTANEOUS PREPARATION OF METHACRYLONITRILE AND 1,3-BUTADIENE

Shigeo Takenaka; Hitoshi Shimizu; Akira Iwamoto, and Yasuo Kuroda, all of Takasaki, Japan, assignors to Nippon Kayaku Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 255,129, May 19, 1972, abandoned. This application Nov. 1, 1974, Ser. No. 520,165

Claims priority, application Japan, May 26, 1971, 46-35500

Int. Cl.² C07C *120/14*, *11/12*

U.S. Cl. 260—465.3 **6 Claims**

1. A process for the simultaneous preparation of methacrylonitrile and 1,3-butadiene from a mixed butane-butene gas containing isobutylene and n-butene, which is a residuum obtained after extraction of 1,3-butadiene from C4 B-B fraction formed as by-product on cracking of naphtha which comprises subjecting such a mixed gas wherein the ratio of butanes and butenes is 4.6–36 : 95.4–64 and the ratio of isobutylene and n-butene is 12.7–83.9 : 87.3–16.1 at a high temperature and in vapor phase to catalytic ammoxidation and oxidative dehydrogenation using oxygen and ammonia in the presence of a catalyst

$CO_aFe_bBi_cMg_dQ_eMo_fO_g$

wherein Co, Fe, Bi, Mg, Mo and O are chemical symbols representing cobalt, iron, bismuth, magnesium, molybdenum and oxygen, respectively, Q is at least one element selected from the group consisting of potassium, rubidium and cesium and *a*, *b*, *c*, *d*, *f*, *g*, and *h* are the number of atoms of Co, Fe, Bi, Mg, Mo, O and Q, respectively, with being a value of from 1 to 15, *b* from 0.5 to 7, *c* from 0.1 to 4, *d* from 0 to 4, *f* being fixed at 12, *g* being a value of from 39 to 72 determined naturally from the valences of other metal atoms, and *h* from 0.01 to 1.0, the reaction being carried out at a temperature of from 300° C to 500° C, whereby there is produced methacrylonitrile and 1,3-butadiene in a ratio of 13.8–85.5 : 86.2–14.5 said catalyst being prepared by adding to aqueous solution of ammonium molybdate, at least one of potassium compound, rubidium compound and cesium compound and bismuth nitrate and water-soluble compounds of iron, cobalt and, optionally magnesium, evaporating the mixture to dryness, and treating the resulting cake at high temperatures ranging from 550° to 750° C in the presence of air or oxygen.

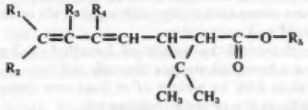
3,998,868

ALKADIENYLCYCLOPROPANECARBOXYLATES

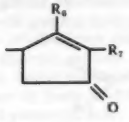
Toshio Mizutani, Toyonaka; Nobushige Itaya; Nobuo Ohno, both of Ikeda; Takashi Matsuo, Amagasaki; Shigeyoshi Kitamura, and Yositosi Okuno, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 265,494, June 23, 1972, Pat. No. 3,954,814. This application Aug. 14, 1975, Ser. No. 604,789
Claims priority, application Japan, June 28, 1971, 46-47444
Int. Cl.² C07C *69/74*
U.S. Cl. 260—468 H **4 Claims**

1. A compound of the formula,



wherein R_1, R_2, R_3 and R_4 are respectively hydrogen atom or methyl, R_5 is



wherein R_6 is hydrogen atom or methyl and R_7 is alkenyl, alkadienyl, alkynyl or benzyl.

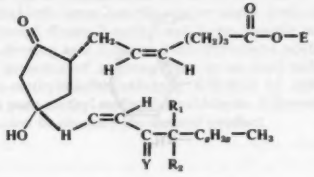
3,998,869

SUBSTITUTED ANILIDE ESTERS OF 16-SUBSTITUTED PGE_2

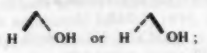
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 14, 1974, Ser. No. 523,568
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D **10 Claims**

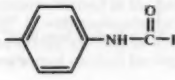
1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein C_9H_{2g} is alkylene of one to 9 carbon atoms, inclusive, with one to 5 carbon atoms, inclusive, in the chain between $—CR_1R_2—$ and terminal methyl; R_1 and R_2 are hydrogen, methyl, ethyl, or fluoro, being the same or different, with the proviso that at least one of R_1 and R_2 is other than hydrogen and with the further proviso that R_2 is fluoro only when R_1 is hydrogen or fluoro; Y is

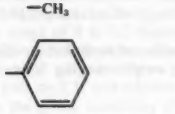


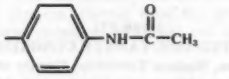
and and E is

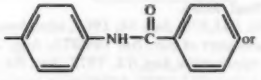


(1)

wherein R_6 is

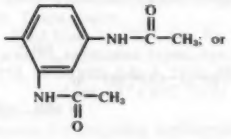




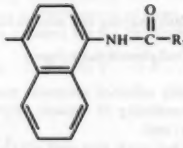


$—NH_2$;

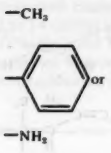
(2)



(3)



wherein R_7 is



3,998,870

SULFONATED AROMATIC POLYISOCYANATES AND PREPARATION OF STABLE ANIONIC POLYURETHANE OR POLYUREA LATICES THEREFOR

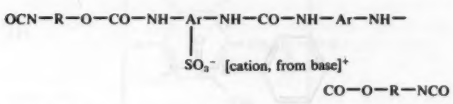
Robert C. Carlson, Hastings, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 841,570, July 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 749,573, Aug. 2, 1968, abandoned. This application Apr. 14, 1975, Ser. No. 568,114

Int. Cl.[2] C07C *149/40*

U.S. Cl. 260—470 **2 Claims**

1. A polymeric compound of the formula



wherein R is a prepolymer chain having the structural formula
—Ar—NH—CO—O—(alkyleneoxy)$_m$ alkylene—

Ar is an aromatic nucleus independently selected from the group consisting of toluene, diphenylmethane and diphenylether, and

m is a number selected such that the alkyleneoxy moiety has a molecular weight ranging from about 300 to about 5000.

3,998,871

SULFONATED ISOCYANATE COMPOSITIONS

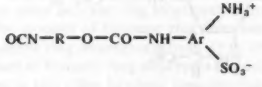
Robert C. Carlson, Hudson Township, County of Saint Croix, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 841,570, July 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 749,573, Aug. 2, 1968, abandoned. This application Aug. 14, 1972, Ser. No. 280,240

Int. Cl.[2] C07C *149/40*

U.S. Cl. 260—470 **2 Claims**

1. A polymeric compound having the structural formula



wherein

R is a prepolymer chain having the structural formula

—Ar—NH—CO—O(alkyleneoxy)$_m$alkylene—

Ar is an independently selected aromatic nucleus selected from the group consisting of toluene, diphenylmethane and diphenylether, and

m is a number selected such that said alkyleneoxy moiety has a molecular weight ranging from about 300 to about 5000.

3,998,872

PREPARATION OF UNSATURATED CARBONYL COMPOUNDS

Ted Symon, Lombard, and Nils J. Christensen, Palatine, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Oct. 5, 1970, Ser. No. 78,290

Int. Cl.[2] C07C *67/30, 69/73*

U.S. Cl. 260—483 **4 Claims**

1. A process for the preparation of an allylic carbonyl compound which comprises reacting, at a temperature of from about −20° C. to about 150° C. and a pressure of from about atmospheric to about 1000 atmospheres, a conjugated diolefinic hydrocarbon with a compound possessing an active methylene group selected from the group consisting of alkyl acetoacetate, propioacetate and butyroacetate having an alkyl group of from 1 to 7 carbon atoms, in the presence of a catalyst system consisting essentially of a palladium compound and a trihydrocarbyl phosphine or phosphite, said compound possessing an active methylene group being present in a mol excess over said diolefinic hydrocarbon in a mol ratio of about 1.2:1 to about 2:1 mols of said compound possessing an active methylene group to said diolefinic hydrocarbon, and recovering the resultant allylic carbonyl compound.

3,998,873

PROCESS FOR PREPARING ONE OR MORE ALKYL-2-METHYL PENTENOATES BY MEANS OF HYDROGENATION OF ONE OR MORE ALKYL-2-METHYL-3,4-PENTADIENOATES

John B. Hall, Rumson, and Denis E. Hruza, Brick Town, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,853

The portion of the term of this patent subsequent to July 22, 1991, has been disclaimed.

Int. Cl.[2] C07C *69/54*

U.S. Cl. 260—486 R **2 Claims**

1. A composition of matter consisting essentially of at least two 6-carbon-atom-containing carboxylic acids or lower alkyl esters thereof and containing:

a. More than 60% by weight of 2-methyl-cis-3-pentenoic acid or a lower alkyl ester thereof; and

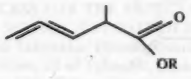
b. Less than 40% by weight of at least one compound selected from the group consisting of:

i. 2-methyl-4-pentenoic acid or a lower alkyl ester thereof; and

ii. 2-methyl pentanoic acid or a lower alkyl ester thereof

produced by the process comprising the steps of:

i. Intimately contacting with hydrogen gas, an alkyl-2-methyl-3,4-pentadienoate having the structure:



in the presence of a hydrogenation catalyst selected from the group consisting of:

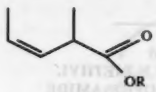
a. Raney nickel;

b. Palladium-on-carbon; and

c. Palladium-on-calcium carbonate

at a temperature in the range of from about 10° C up to about 100° C; a hydrogen pressure in the range from about 5 psig up to about 80 psig, the concentration of said catalyst, based on the weight of alkyl-2-methyl-3,4-pentadienoate, being from about 0.1% up to about 10%;

ii. Physically recovering a chemical composition from the reaction mass which contains at least 60% by weight of an alkyl-2-methyl-cis-3-pentenoate having the structure:



wherein R is alkyl having from 1 up to 6 carbon atoms.

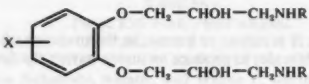
3,998,874

PHENYLENE DI-ETHERS

Wijbe Thomas Nauta, Nieuw-Loosdrecht, Netherlands, assignor to Gist-Brocades N.V., Netherlands

Continuation-in-part of Ser. No. 127,382, March 23, 1971, abandoned. This application Feb. 1, 1974, Ser. No. 438,765
Int. Cl.² C07C 93/06
U.S. Cl. 260—501.17 8 Claims

1. A compound selected from the group consisting of phenylene di-ethers of the formula



wherein R represents as isopropyl or tertiary butyl group and X represents hydrogen or lower alkyl and acid addition salts thereof.

3,998,875

PROCESS OF PREPARING 5-FLUORO-2-METHYL-1-(PARAMETHYLSULFINYL-BENZYLIDENE)-INDENYL-3-ACETIC ACID

Roger J. Tull, Metuchen, and David G. Melillg, Scotch Plains, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 2, 1974, Ser. No. 511,349
Int. Cl.² C07C 147/14
U.S. Cl. 260—515 A 7 Claims

1. A process of preparing 5-fluoro-2-methyl-1para-methylsulfinylbenzylidene)-indenyl-3-acetic acid which comprises the steps of:

a. acylating fluorobenzene with gamma-carbonylhalide-gamma-valerolactone, gamma-carboxy-gamma-valerolactone or gamma-carboxy-gamma-valerolactone anhydride in the presence of gallium trihalide, aluminum trihalide, antimony trihalide, titanium tetrahalide, boron trihalide or iron trihalide to form gamma-(para-fluorobenzoyl)-gamma-valerolactone; or acylating fluorobenzene with gamma-methyl-glutaconic anhydride in the presence of aluminum chloride, polyphosphoric acid, hydrogen fluoride, sulfuric acid, fluoroboric acid, boron trifluoride, boron trichloride or boron tribromide at a temperature of from 0°–85° C to form 4-(para-fluorobenzoyl)-3-pentenoic acid;

b. cyclizing said gamma-(para-fluorobenzoyl)-gamma-valerolactone or said4-(para-fluorobenzoyl)-3-pentenoic acid at a temperature of from 80°–200° C in an inert solvent in the presence of gallium trihalide, aluminum trihalide, antimony trihalide, titanium tetrahalide, boron trihalide or iron trihalide to form 5-fluoro-2-methyl-indanone-3-acetic acid;

c. reducing said 5-fluoro-2-methyl-indanone-3-acetic acid in the presence of alkali metal borohydride, aluminum isopropoxide or in the presence of nickel, iridium, rhenium, ruthenium, rhodium, platinum or palladium or a reduced metal oxide thereof and hydrogen under a pressure of from atmospheric to 200 atmospheres in the presence of an inert solvent to form 5-fluoro-2-methyl-indanol-3-acetic acid;

d. dehydrating said 5-fluoro-2-methyl-indanol-3-acetic acid at a temperature of from 20°–150° C in the presence of an inert solven under acid conditions to form 5-fluoro-2-methyl-ind-1-ene-3-acetic acid or under basic conditions to form 5-fluoro-2-methyl-ind-2-ene-3-acetic acid;

e. condensing said 5-fluoro-2-methyl-indene acetic acid in the presence of a strong base in an inert solvent with para-methylthiobenzaldehyde followed by oxidation or with para-methyl-sulfinylbenzaldehyde, followed by acidification to produce the desired product.

3,998,876

CATALYTIC PROCESS FOR PREPARATION OF UNSATURATED CARBOXYLIC ACIDS

Masaaki Kato, Yamaguchi; Hiroshi Sonobe, Otake; Hiromichi Ishii, Otake; Masao Kobayashi, Otake, and Kantaro Yamada, Otake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 407,571, Oct. 18, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 545,905
Claims priority, application Japan, Aug. 16, 1973, 48-91976
Int. Cl.² C07C 51/32
U.S. Cl. 260—530 N 7 Claims

1. A process for the preparation of unsaturated carboxylic acids, which comprises: catalytically oxidizing acrolein, methacrolein or mixtures thereof in the gas phase at a temperature of 240° to 390° C with molecular oxygen to form the corresponding unsaturated carboxylic acid in the presence of a non-carrier supported catalyst having a composition

$$P_aMo_bAs_c(NH_4)_dX_eY_fO_g$$

wherein a, b, c, e, f and g represent the atomic ratio of each component and a is within the range of 0.03 to 0.2, b is 1, c is within the range of 0.015 to 0.15, e is within the range of 0.003 to 1, f is within the range of 0 to 0.17, g is a value which is determined by the valences of the elements in the catalyst, and d designates the number of ammonium groups which are within the range of 0.01 to 0.3, and wherein X is at least one metal selected from the group consisting of vanadium, tungsten, copper, iron, manganese, and tin, and Y is at least one alkali metal element selected from the group consisting of lithium, sodium, potassium, rubidium and cesium.

3,998,877

PROCESS FOR PREPARING METHACRYLIC ACID

Yoshio Oda; Keiichi Uchida; Takeshi Morimoto, and Seisaku Kumai, all of Yokohama, Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,472
Claims priority, application Japan, Apr. 2, 1974, 49-36597; Apr. 2, 1974, 49-36598; July 2, 1974, 49-74971
Int. Cl.² C07C 51/32
U.S. Cl. 260—530 N 7 Claims

1. A process for preparing methacrylic acid which comprises reacting methacrolein with molecular oxygen in the vapor phase at a temperature of from 230° C to 450° C in the presence of a catalyst having the formula

$$Mo_{12}P\,\alpha\quad Cs\beta\quad Sn\gamma\quad O\,\delta$$

wherein

$\alpha' = 0.1 - 3$;
$\beta' = 0.2 - 9$;
$\gamma' = 0.1 - 7$;
$\delta' = 36 - 100$.

3,998,878

SELECTIVELY SEPARATING OXALIC, TARTARIC, GLYOXYLIC AND ERYTHRONIC ACIDS FROM AQUEOUS SOLUTIONS CONTAINING THE SAME

William Montgomery Hearon, Portland, Oreg.; Cheng Fan Lo, and John F. Witte, both of Vancouver, Wash., assignors to Boise Cascade Corporation, Portland, Oreg.

Filed Nov. 5, 1975, Ser. No. 628,888
Int. Cl.² C07C *59/14*
U.S. Cl. 260—536 17 Claims

1. The process for separating oxalic, tartaric, glyoxylic and erythronic acids from aqueous solutions containing the same, comprising:

a. adding calcium ion to the solution in at least the stoichiometric amount required for the substantially complete conversion of the oxalic acid content thereof to calcium oxalate, while maintaining the solution substantially unsaturated with respect to tartaric acid, glyoxylic acid, erythronic acid and the calcium salts thereof,

b. adjusting the pH of the solution to a value of from pH 0.9 to pH 2.0, thereby precipitating insoluble calcium oxalate,

c. removing the precipitated calcium oxalate from the solution,

d. adding a further quantity of calcium ion to the resulting substantially calcium oxalate-free second solution in at least the stoichiometric amount required for the substantially complete conversion of the tartaric acid content thereof to calcium tartrate, while maintaining the second solution substantially unsaturated with respect to glyoxylic acid, erythronic acid and the calcium salts thereof,

e. adjusting the pH of the second solution to a value of from 2.8 to 4.4, thereby precipitating insoluble calcium tartrate,

f. removing the precipitated calcium tartrate from the second solution,

g. concentrating the resulting third solution,

h. adding calcium ion to the resulting substantially calcium oxalate-free and calcium tartrate-free third solution in at least the stoichiometric amount required for the substantially complete conversion of the glyoxylic acid content thereof to calcium glyoxylate, while maintaining the third solution substantially unsaturated with respect to erythronic acid and the calcium salt thereof,

i. adjusting the pH of the third solution to a value of from 4.5 to 5.4 thereby precipitating calcium glyoxylate, and

j. separating the precipitating calcium glyoxylate from the third solution, thereby providing a residual solution comprising a water solution of erythronic acid and its calcium salt.

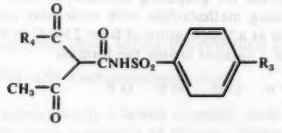
3,998,879

ARYLSULFONYLCARBAMOYL-1,3-DICARBONYLACYCLIC COMPOUNDS

Frederick A. Grunwald, Evansville, Ind., assignor to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 478,497, June 12, 1974, Pat. No. 3,917,692. This application Aug. 15, 1975, Ser. No. 604,971
Int. Cl.² C07C *143/78*; A61K *31/18*
U.S. Cl. 260—556 AC 4 Claims

1. A compound



wherein

R_3 is hydrogen, halogen or lower alkyl of 1 to 4 carbon atoms inclusive;

R_4 is methyl, phenyl, or benzyl; and pharmeceutically acceptable basic salts thereof.

3,998,880

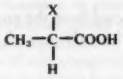
PRODUCTION OF N,N-DIETHYL 2(α-NAPHTHOXY)PROPIONAMIDE

Alexander Mihailovski, Kensington, and Raymond A. Simone, Walnut Creek, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

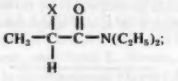
Filed Aug. 15, 1975, Ser. No. 604,968
Int. Cl.² C07C *103/22*, *103/30*; A01N *9/20*
U.S. Cl. 260—559 B 22 Claims

1. A process for the production of N,N-diethyl 2(α-naphthoxy)propionamide, comprising:

a. reacting diethyl amine with a carboxylic acid having the formula



in which X is chloro or bromo, in the presence of phosphoryl chloride, to produce an amide having the formula



b. reacting α-naphthol with an excess of the amide produced in step (a), in the presence of an excess of an aqueous solution of an alkali metal hydroxide, and

c. removing unreacted amide from the reaction products.

3,998,881

HYDROGENATION OF PHTHALONITRILES USING RHODIUM CATALYST

Walter Albert Butte, Jr., West Chester, and William J. Murtaugh, Eddystone, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Filed Nov. 13, 1974, Ser. No. 523,298
Int. Cl.² C07C *85/02*
U.S. Cl. 260—563 R 5 Claims

1. A process for the preparation of 1,3- or 1,4-bis-(aminomethyl) cyclohexane by hydrogenating in the presence of a supported rhodium catalyst at a temperature between about 50° and 150° C., and at a pressure between about 500 and about 1500 psig. a solution of iso- or terephthalonitrile in a solvent inert to said hydrogenation and having a solubility parameter of from about 9 to about 12 and said solution containing from about 10 to about 25 percent by volume of anhydrous ammonia.

3,998,882

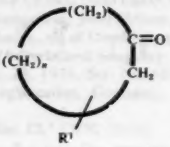
2-ALKOXY-3-OXIMINOCYCLOALKENES AND PRODUCTION THEREOF

Milorad M. Rogić, Whippany, and Robert Fuhrmann, Morris Plains, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 513,014, Oct. 8, 1974, which is a continuation-in-part of Ser. No. 372,456, June 21, 1973, abandoned. This application Oct. 29, 1975, Ser. No. 626,806
Int. Cl.² C07C *131/08*
U.S. Cl. 260—566 A 8 Claims

1. A method for the production of 2-alkoxy-3-oximinocycloalkenes comprising the steps of:

a. reacting a ketone of the formula



wherein n is an integer 2–9 and R^1 is a member of the group consisting of hydrogen, aliphatic C_1–C_{10} radical with a nitrosating agent in the presence of an inert, non-basic solvent selected from the group of sulfur dioxide, sulfolane, nitromethane, or nitrobenzend, an aliphatic alcohol, R^2OH in which R^2 is an aliphatic C_1–C_{10} radical or C_5–C_6 cyclic radical and at least one equivalent of a strong mineral acid, or a strong Lewis acid

b. neutralizing the product of step (a).

3,998,883

PROCESS FOR PREPARING 6-CHLORO-2-CHLOROMETHYL-4-PHENYLQUINAZOLINE-3-OXIDE AND INTERMEDIATES THEREFOR

Susumu Nakanishi, Niantic, and Wayne E. Barth, East Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 508,103, Sept. 23, 1974, Pat. No. 3,932,325. This application Oct. 28, 1975, Ser. No. 626,319

Int. Cl.² C07C *119/00*

U.S. Cl. 260—566 D **1 Claim**

1. 2-(1′-chloroimino-2′-chloromethyl)-5-chlorobenzophenone.

3,998,884

CATALYTIC CONVERSION OF PHENOL TO CYCLOHEXANOL AND/OR CYCLOHEXANONE

Charles Arnold Gibson, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Apr. 4, 1975, Ser. No. 565,086

Int. Cl.² C07C *27/00, 29/20, 45/00*

U.S. Cl. 260—586 P **8 Claims**

1. A vapor phase process which comprises contacting, in a catalyst zone, (a) phenol, and (b) a gas containing from about 30 to about 65 mole per cent hydrogen, the remainder of said gas being composed principally of at least one inert gas, with a metallic nickel hydrogenation catalyst, at an elevated temperature sufficient to produce cyclohexanol or a mixture of cyclohexanol and cyclohexanone, said elevated temperature being such that the temperature in said catalyst zone is within the range of from about 100° to about 230° C., and wherein said process is carried out at a pressure of up to about 3 atmospheres.

3,998,885

METHOD OF SEPARATING COMPONENTS OF NITROOXIDATION REACTION MIXTURE

Shizuo Yamada; Hiroo Sasaki, and Tetsuo Tanaka, all of Shinnanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed June 18, 1973, Ser. No. 371,309

Claims priority, application Japan, June 16, 1972, 47-60246

Int. Cl.² C07C *76/02, 76/06, 45/02, 45/24*

U.S. Cl. 260—586 P **10 Claims**

1. In the preparation of 2-nitrocycloalkanone, 2-nitrocycloalkenone and 2-nitrocycloalkadienone by nitrooxidizing a cycloalkene, cycloalkadiene or cycloalkatriene in the presence of nitrogen dioxide, oxygen and an organic catalyst and separating said 2-nitrocycloalkanone, 2-nitrocycloalkenone or 2-nitrocycloalkadienone from the nitrooxidation medium, the improvement which comprises:

precipitating ammonium nitrate by contacting said reaction mixture with gaseous ammonia;

separating said precipitated ammonium nitrate;

precipitating a colored impurity by contacting said reaction mixture free of ammonium nitrate with gaseous ammonia;

filtering said precipitated colored impurity;

precipitating the ammonium salt of 2-nitrocycloalkanone, 2-nitrocycloalkenone, or 2-nitrocycloalkadienone by contacting said reaction mixture free of ammonium nitrate and colored impurity with gaseous ammonia;

and filtering the precipitated ammonium salt of 2-nitrocycloalkanone, 2-nitrocycloalkenone or 2-nitrocycloalkadienone.

3,998,886

PRODUCTION OF HALOGEN-CONTAINING TERTIARY PHOSPHINE OXIDES

Bernd Lippsmeier, Hurth-Knapsack; Klaus Hestermann, Erftstadt Bliesheim, and Hubert Neumaier, Hurth-Knapsack, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 13, 1975, Ser. No. 557,926

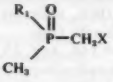
Claims priority, application Germany, Mar. 16, 1974, 2412800

The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.

Int. Cl.² C07F *9/02*

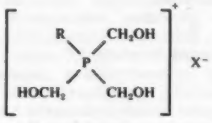
U.S. Cl. 260—606.5 P **13 Claims**

1. A process for making halogen-containing tertiary phosphine oxides of the general formula (I)



(I)

in which R_1 is selected from the group consisting of alkyl, halogenoalkyl, alkenyl, halogenoalkenyl, alkinyl and halogenoalkinyl containing from 1 to 18 carbon atoms, cycloalkyl, halogenated cycloalkyl, aryl, halogenated aryl, aralkyl and halogenated aralkyl, and X is halogen, which process comprises subjecting a compound of the general formula (II)



(II)

in which R is selected from the group consisting of alkyl, halogenoalkyl, alkenyl, halogenoalkenyl, alkinyl and halogenoalkinyl containing from 1 to 18 carbon atoms, cycloalkyl, halogenated cycloalkyl, aryl, halogenated aryl, aralkyl halogenated aralkyl and $—CH_2OH—$, and X is halogen, to thermal treatment in the presence of hydrogen halide at atmospheric or at elevated pressure so as to split off water and formaldehyde in vapor form therefrom; continuously freeing the resulting reaction mixture from the said components in vapor form; terminating the reaction and thereafter stripping off the hydrogen halide from the reaction mixture by introducing an inert gas thereinto; and purifying the remaining crude product by distillation or recrystallization.

3,998,887

p-STYRYLDIETHYLPHOSPHINE

James D. Allen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 832,729, June 12, 1969, Pat. No. 3,847,997. This application June 7, 1974, Ser. No. 477,178

Int. Cl.² C07F *9/50*

U.S. Cl. 260—606.5 P **1 Claim**

1. p-Styryldiethylphosphine.

3,998,888
SYNTHESIS OF SULFONYL PEROXIDES

James A. Manner, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,008
Int. Cl.² C07C *147/00*
U.S. Cl. 260—607 R 18 Claims

1. In the process for producing an acyl alkanesulfonyl peroxide from an alkane reactant and a carboxylic acid anhydride by the introduction of sulfur dioxide gas, an oxygen-containing gas, and a carboxylic acid anhydride into a liquid reaction phase containing the alkane reactant, the improvement which comprises:

introducing into the liquid reaction phase simultaneously with the introduction of the sulfur dioxide gas, the oxygen-containing gas, and the carboxylic acid anhydride, an inert solvent for the sulfonyl peroxide which is immiscible with the liquid reaction phase, and which forms lower liquid product phase containing sulfonyl peroxide dissolved in inert solvent, the solvent being a dialkyl ester of phthalic acid, wherein the alkyl groups have from 1 to 12 carbons, and

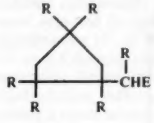
recovering from the product phase a solution of acyl alkanesulfonyl peroxide in dialkyl ester of phthalic acid.

3,998,889
PROCESS FOR PRODUCING CYCLOPROPYL SUBSTITUTED ORGANOSULFIDES

Donald John Peterson, Cincinnati, and Medford Dwight Robbins, Fairfield, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 390,156, Aug. 23, 1973, Pat. No. 3,959,324, which is a continuation-in-part of Ser. No. 247,641, April 26, 1972, abandoned. This application June 12, 1975, Ser. No. 586,456
Int. Cl.² C07C *149/30*
U.S. Cl. 260—609 E 7 Claims

1. A process for preparing substituted cyclopropylcarbinyl compounds of the formula



wherein each R is a member selected from the group consisting of hydrogen, alkyl, aryl, alkenyl, substituted alkyl, substituted aryl and substituted alkenyl substituents, and E is a substituent derived from an electrophile source which is an organo sulfenyl halide, comprising admixing an organotin compound of the formula

$$(CR_2{=}CRCR_2CR_2)_x\ {-}SnR^1{}_{4-x}$$

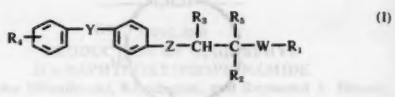
wherein x is an integer of from 1 to 4 and R^1 is an alkyl substituent, with an electrophile source which is an organic sulfur halide.

3,998,890
ETHER DERIVATIVES OF PHENYLTHIOBENZENES

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 570,978, April 23, 1975, Pat. No. 3,957,885. This application Apr. 9, 1976, Ser. No. 675,400
Claims priority, application Switzerland, Apr. 26, 1974, 5756/74; Mar. 14, 1975, 3206/75
Int. Cl.² C07C *149/32*
U.S. Cl. 260—609 F 7 Claims

1. A compound of the formula



(I)

wherein

W and Z each represent —O— or —S—,

Y represents —S—,

R_1 represents C_1–C_6-alkyl, C_2–C_4-alkenyl, C_2–C_4-haloalkenyl, C_3–C_4-alkynyl, C_3–C_6-cycloalkyl or benzyl,

R_2 represents hydrogen, methyl or ethyl,

R_3 represents hydrogen or methyl, or

R_2 and R_3 together with the chain represent a saturated 5- or 6-membered ring, and

R_4 represents hydrogen, methyl or halogen, and

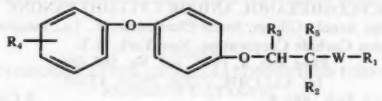
R_5 represents hydrogen or methyl.

3,998,891
PHENOXYPHENYLALKYLTHIO-, ALKENYLTHIO-, ALKINYLTHIO- AND BENZYLTHIO-ALKOXY ETHERS

Friedrich Karrer, Basel, and Saleem Farooq, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 569,040, April 17, 1975, Pat. No. 3,963,786. This application Apr. 19, 1976, Ser. No. 677,996
Claims priority, application Switzerland, Apr. 18, 1974, 5364/74; Mar. 12, 1975, 3123/75
Int. Cl.² C07C *149/32*
U.S. Cl. 260—609 F 2 Claims

1. A compound of the formula



wherein

W represents —S—,

R_1 represents C_1–C_6-alkyl, C_3–C_6-cycloalkyl or C_5–C_6-cycloalkenyl, C_2–C_4-haloalkenyl, C_3–C_5-alkynyl, C_2–C_4-alkenyl or benzyl,

R_2 represents hydrogen, methyl or ethyl,

R_3 represents hydrogen or methyl, or

R_2 and R_3 together with the chain represent a 5- or 6-membered saturated ring, and

R_4 and R_5 each represent hydrogen or methyl.

3,998,892
PREPARATION OF PREHNITENOL

Bruce E. Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Nov. 17, 1975, Ser. No. 632,335
Int. Cl.² C07C *39/06*
U.S. Cl. 260—621 E 5 Claims

1. A process for preparing 2,3,4,5-tetramethylphenol which comprises reacting phenol with pentamethylphenol in the liquid phase in the presence of an effective amount of a catalyst selected from the group consisting of activated carbon, magnesium oxide and calcium oxide, said process being characterized further in that (1) it produces a product mixture which contains an amount of 2,3,4,5-tetramethylphenol which is greater than the combined amounts of 2,3,4,6-tetramethylphenol and 2,3,5,6-tetramethylphenol, and (2) the pressure is in the range of about 30 to about 125 atmospheres and the temperature is in the range of about 375° to about 500° C.

3,998,893

PROCESS FOR PREPARING DINITRONAPHTHALENES

Friedrich Dürholz, Remscheid; Josef Heinen, and Adolf Hamers, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,993

Claims priority, application Germany, Feb. 12, 1975, 2505715

Int. Cl.² C07C 79/10

U.S. Cl. 260—645 3 Claims

1. Process for preparing dinitronaphthalene which comprises reacting nitronaphthalene at temperatures of from 20° to 50° C with 60 to 80% strength by weight aqueous nitric acid, separating off the resulting dinitronaphthalene and enriching the residual nitric acid until a concentration of 60 to 80% by weight is reached and recycling same to the reaction.

3,998,894

MANUFACTURE OF 1-METHYL-3-(MONOHALOGENO)-PHENYLINDANS AND DIHALOGENO-1-METHYL-3-PHENYLINDANS

Heinz Eilingsfeld, Frankenthal; Karl Gerhard Baur; Manfred Patsch, both of Ludwigshafen; Rolf Platz, Mannheim; Hans-Georg Schecker, Ludwigshafen, and Martin Fischer, Ellerstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Rhine, Germany

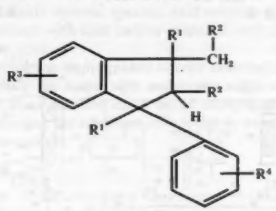
Filed Nov. 15, 1973, Ser. No. 416,256

Claims priority, application Germany, Nov. 18, 1972, 2256702; June 1, 1973, 2327867; May 30, 1973, 2327569

Int. Cl.² C07C 25/28; B01J 1/10; C07C 17/26

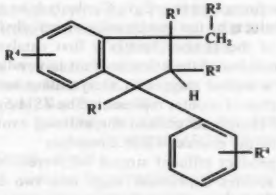
U.S. Cl. 260—649 R 13 Claims

1. A process for the manufacture of a 1-alkyl-3-(monohalogeno)-phenylindan of the formula



I

and a dihalogeno-1-methyl-3-phenylindan of the formula

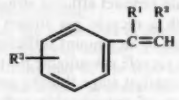


Ia,

where R^1, R^2 and R^3 each is C_1 to C_4 alkyl or hydrogen and R^4 is halogen, which process comprises:

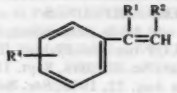
reacting as the sole starting materials to be dimerized and cyclized

A. a mixture of styrene of the formula



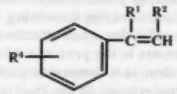
II

and a halogenostyrene of the formula



III

B. a halogenostyrene of the formula



III

in which R^1, R^2, R^3 and R^4 have the above meanings, in a phosphoric acid of a strength of at least 75 per cent by weight and additionally in the presence of a compound which has been activated by irradiation with light of 2,000 to 8,000 A and is capable of absorbing said light, said light-activated compound being selected from the group consisting of thiourea, methylthiourea, phenylthiourea, N,N-diphenylthiourea, N,N'-diphenylthiourea, N-methyl-N-(p-toluyl)-thiourea, S-benzyl-N-phenylisothiouronium picrate, S-methyl-dithiobiuret hydrochloride, phenylmethylthiourea, 2,4-dimethoxyphenylthiourea, 4-methoxy-phenylthiourea, di-n-butylthiourea, 1-benzoyl-thiosemicarbazide, dithiobiuret, hydroquinone monomethyl ether, 4-butyl-pyrocatechol, N-benzyl-p-aminophenol, o-aminophenol, 2-mercaptobenzimidazole, 2-mercapto-4-anilinoquinazoline, 2-thiocyanomethylbenzimidazole, phenothiazine, thionaphthene, 2-mercaptobenzthiazole, 2-aminobenzthiazole, 3-aminobenzisothiazole, 2-methylbenzthiazole, diphenylenesulfide, 2,5-dimercapto-1,3,4-thiadiazole, thianthrene, leuco-methylene blue, tetramethylenetrithione, diphenylamine, m-acetaminodiphenylamine, N-phenyl-α-naphthylamine, N-phenyl-β-naphthylamine, p-isopropylamino-diphenylamine, aromatic hydrazines, o-, p- and m-nitrosophenol, N-nitrisophenylhydroxylamine ammonium salt (cupferron), nitrogen monoxide, dinitrogen tetroxide, triphenylphosphine, triphenylphosphite, thiocarboxylic acid amides, thioacetamide, anthranilic acid thiamide, 2-amino-5-nitrothiobenzamide, 2-amino-3-bromo-5-nitrothiobenzamide, 2-amino-3,5-dibromothiobenzamide, thiobenzamide, nitrobenzene, m-dinitrobenzene, m-nitroaniline, m-nitrophenol, nitroanthraquinone, p-benzoquinone, anthraquinone, 2,3,4,5-tetramethylquinone, toluquinone, chloranil, naphthoquinone and benzophenone.

3,998,895

PREPARATION OF POLYCHLOROALKENYL AROMATIC COMPOUNDS

Louis Schmerling, Riverside, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 6, 1975, Ser. No. 602,498

Int. Cl.² C07C 25/24

U.S. Cl. 260—651 R 9 Claims

1. A process for the preparation of a polychloroalkenyl aromatic compound which comprises condensing a polychloroalkene containing from 2 to about 4 carbon atoms and characterized by the presence of at least 1 chlorine atom on each of the doubly-bonded carbon atoms with a chloroalkyl aromatic compound containing at least 1 hydrogen atom attached to an alpha carbon atom in the presence of hydrogen chloride and a catalyst comprising a free radical-generating compound at a temperature in the range of from about 50° to about 300° C. and at least as high as the decomposition temperature of said free radical-generating compound, and recovering the resultant polychloroalkenyl atomatic compound.

3,998,896
PRODUCTION OF MONOCHLORO-SUBSTITUTED SATURATED COMPOUNDS

Herman S. Bloch, Skokie, and Louis Schmerling, Riverside, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 507,086, Sept. 18, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 607,083
Int. Cl.[2] C07C *17/00*
U.S. Cl. 260—658 C 9 Claims

1. In a process for producing a monochloro-substituted saturated compound by condensing an acyclic aliphatic saturated hydrocarbon containing a secondary or tertiary carbon atom with a monochloromonoolefin possessing up to 14 carbon atoms and having the chlorine atom attached to one of the doubly-bonded carbon atoms in the presence of a free radical-generating peroxide catalyst at a temperature at least as high as the decomposition temperature of the free radical catalyst and a pressure of from about 1 atmosphere to about 100 atmospheres, and recovering the resultant monochloro-substituted saturated compound, the improvement which comprises effecting said condensation in the presence of a promoter comprising hydrogen chloride.

3,998,897
SELECTIVE HYDROGENATION OF CYCLOPENTADIENE-NORBORNADIENE MIXTURES

Stephen M. Kovach, and George D. Wilson, both of Ashland, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

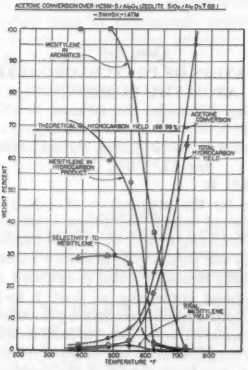
Filed Dec. 19, 1975, Ser. No. 642,374
Int. Cl.[2] C07C *7/00, 13/28*
U.S. Cl. 260—666 A 6 Claims

1. A process for selectively hydrogenating cyclopentadiene present in a liquid cyclopentadiene-norbornadiene mixture comprising contacting said mixture with hydrogen gas in the presence of a catalyst consisting essentially of palladium on an alumina support under conditions sufficient to cause hydrogenation of substantially all of said cyclopentadiene to cyclopentene and/or cyclopentane and substantially none of said norbornadiene.

3,998,898
MANUFACTURE OF GASOLINE

Clarence D. Chang, Princeton; William H. Lang, Pennington, both of N.J., and Anthony J. Silvestri, Morrisville, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 387,224, Aug. 9, 1973, Pat. No. 3,907,915. This application July 2, 1975, Ser. No. 592,434
Int. Cl.[2] C07C *1/20*
U.S. Cl. 260—668 R 8 Claims


ACETONE CONVERSION OVER H-ZSM-5 / Al2O3 ZEOLITE SiO2 / Al2O3 RATIO = 70:1
WEIGHT HOURLY SPACE VELOCITY = 1 ATM
MESITYLENE AROMATICS
ACETONE CONVERSION
THEORETICAL HYDROCARBON YIELD (68.8% by wt.)
TOTAL HYDROCARBON YIELD
MESITYLENE IN HYDROCARBON PRODUCT
SELECTIVITY TO MESITYLENE
TOTAL MESITYLENE YIELD
WEIGHT PERCENT
TEMPERATURE °F

1. In the process of converting lower aliphatic oxygen containing organic compounds of the empirical formula $C_nH_{2p}.pH_2O$ where n is the number of carbon atoms, 1 to 8, p is the number of oxygen atoms and m is the number of hydrogen atoms in the feed, to a product comprising water and hydrocarbons, said hydrocarbons containing a preponderance of the carbon of said organic compounds, by contacting such feed with a crystalline aluminosilicate zeolite catalyst having a silica to alumina ratio of at least about 12 and a constraint index of about 1 to 12 at an elevated temperature of at least about 500° F, and a space velocity of about 0.5 to 50 LHSV; the improvement, whereby increasing the aromaticity of said hydrocarbon product, which comprises providing as said feed a mixture of a difficultly convertible organic compound having a value of

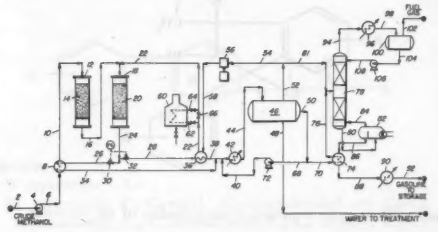
$$R = \frac{m-2p}{n}$$

of up to 1 and an easily convertible organic compound having no carboxylic acid groups and having a value of R of greater than 1, said mixture having a cumulative value of R of greater than 1 and a stoichiometric deficiency of carboxylic acid groups.

3,998,899
METHOD FOR PRODUCING GASOLINE FROM METHANOL

Nicholas Daviduk, Pennington, and Michael T. Siuta, Trenton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,487
Int. Cl.[2] C07C *1/20*
U.S. Cl. 260—668 R 8 Claims



1. In a process for converting C_1 to C_3 alcohols to gasoline boiling range products by the combination of initially forming ether products of the alcohol fuel in a first catalyst stage followed by conversion of the ether product to gasoline boiling products in a second stage with a crystalline zeolite selected from the class of zeolites represented by ZSM-5 crystalline zeolite, the comprised method for utilizing exothermic heat generated by the process which comprises

separating a product effluent stream recovered from the crystalline zeolites conversion stage into two elevated temperature product streams, passing one of said elevated temperature product effluent streams in indirect heat exchange with alcohol fuel being passed to said first catalyst stage in an amount sufficient to raise the temperature of the alcohol fuel up to reaction temperature and recovering a first product stream therefrom of considerably reduced temperature;

passing another of said product effluent streams in indirect heat exchange with a recycle gas stream recovered as hereinafter provided in an amount sufficient to raise the temperature of the recycle gas suitable for passage to said crystalline zeolite catalyst stage thereby providing a second product stream of considerably reduced temperature;

combining said first and second product streams of consid-

erably reduced temperature, further cooling said combined product streams sufficient to permit recovery of a recycle gas stream, a liquid hydrocarbon phase comprising gasoline boiling component and a water phase, recycling said recovered recycle gas to the heat exchange step above recited after compression thereof and

separating said liquid hydrocarbon phase under conditions to recover gasoline boiling components from lower boiling fuel gas components.

3,998,900

DEHYDROGENATION OF HYDROCARBONS WITH A MULTIMETALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 337,983, March 5, 1973, Pat. No. 3,851,003, which is a continuation-in-part of Ser. No. 102,059, Dec. 28, 1970, Pat. No. 3,725,304. This application Aug. 27, 1974, Ser. No. 501,114

The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Int. Cl.² C07C *15/00, 11/12, 3/28*

U.S. Cl. 260—668 D **20 Claims**

1. A method for dehydrogenating a dehydrogenatable hydrocarbon, comprising contacting the hydrocarbon, at dehydrogenation conditions, with a dehydrogenation catalyst prepared by the steps of:

a. impregnating a high surface area, porous carrier material with a solution of a complex chlorostannate (II) chloroplatinate anionic species, said solution being stabilized in contact with said carrier material with an aqueous halogen acid;

b. drying the impregnated carrier material and then impregnating the same with a decomposable compound of an alkali or alkaline earth metal compound; and

c. calcining the resultant composite in an oxygen-containing atmosphere.

3,998,901

SEPARATION OF ETHYLBENZENE WITH AN ADSORBENT COMPRISING SR AND K EXCHANGED X OR Y ZEOLITE

Richard W. Neuzil, Downers Grove, and Donald H. Rosback, Elmhurst, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed July 14, 1975, Ser. No. 595,837

Int. Cl.² C07C *15/28, 15/30*

U.S. Cl. 260—674 SA **27 Claims**

14. A process for separating ethylbenzene from a feed mixture comprising ethylbenzene and a plurality of xylene isomers which process comprises the steps of:

a. contacting at adsorption conditions said mixture with an adsorbent comprising type X or type Y zeolite essentially completely exchanged with strontium and potassium and adsorbing substantially all of said xylene isomers to the substantial exclusion of ethylbenzene;

b. withdrawing from the adsorbent a raffinate stream comprising ethylbenzene;

c. contacting the adsorbent at desorption conditions with a desorbent material having a boiling point substantially different from that of the feed mixture to effect the removal of the xylene isomers; and

d. withdrawing from the adsorbent an extract stream comprising said xylene isomers.

3,998,902

PURIFICATION OF UNSATURATED COMPOUNDS

Alan W. Foster, and Alfio J. Besozzi, both of Houston, Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 223,363, Feb. 3, 1972, abandoned. This application Nov. 29, 1973, Ser. No. 420,043

Int. Cl.² C07C *7/00*

U.S. Cl. 260—680 E **14 Claims**

1. In a vapor phase process for the preparation of unsaturated hydrocarbons comprising

catalytic oxidative dehydrogenation of a feed stream of hydrocarbon compounds having 4 to 8 carbon atoms to produce an unsaturated hydrocarbon product stream having a greater degree of ethylenic unsaturation than said feed stream and containing carbonyl compounds as an impurity

wherein the improvement comprises contacting only said product stream in vapor phase at a temperature in the range of 250° to 800° C. and containing less than 5 mol percent free oxygen with a solid catalyst for destroying said carbonyl compounds and consisting of an oxide, carbonate or hydroxide of one metal selected from Zr, Zn, Ca, Co, Sr, Fe, Ti, Pd or Ce and reducing the carbonyl content of said stream.

3,998,903

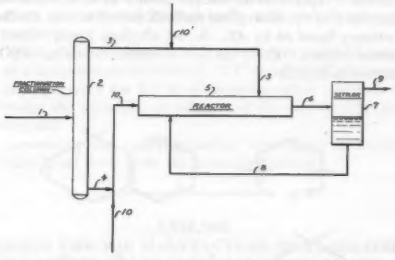
ALKYLATION WITH SEPARATE BUTENE STREAMS INCLUDING ISOBUTYLENE

Jay E. Sobel, Highland Park, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 12, 1976, Ser. No. 648,235

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **7 Claims**



1. A process for alkylating an isoparaffin with a stream comprising 2-butene and a separate stream comprising 1-butene and isobutylene which comprises

a. passing at least a portion of the isoparaffin in admixture with the 2-butene stream and HF acid catalyst to an upstream portion of a reactor wherein the 2-butene reacts with the isoparaffin in an exothermic reaction which increases the temperature of the reactants, acid, and alkylate,

b. charging to a downstream portion of the reactor a stream comprising 7-butene and isobutylene,

c. separating a hydrocarbon phase comprising alkylate products and unreacted isoparaffins; from HF catalyst phase, and

d. separating said alkylate products from said hydrocarbon phase of step (c).

3,998,904

POLYAMINES WITH IMIDE GROUPS

Maurice Balme, Sainte-foy-les-Lyon, and Max Gruffaz, La Mulatiere, both of France, assignors to Rhone-Poulenc S.A., Paris, France

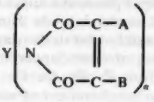
Division of Ser. No. 297,738, Oct. 16, 1972. This application May 20, 1975, Ser. No. 579,235

Claims priority, application France, Oct. 18, 1971, 71.37311

Int. Cl.² C08G *45/12*

U.S. Cl. 260—830 R 17 Claims

1. Process for preparing a cured epoxy resin which comprises heating a mixtue of a 1,2-poly epoxy resin and a polyamine obtained by heating at least one unsaturated polyimide of the general formula:

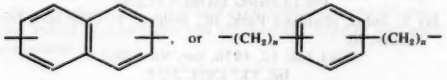


with at least one polyamine of the general formula:

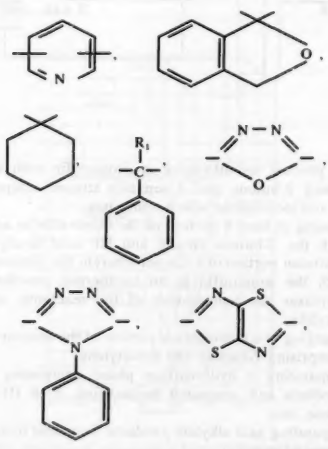
$$Z(NH_2)_b$$

in bulk at between 50° C and 200° C., in which a and b each independently represents a number ranging from 2 to 4, Y and Z, which may be identical or different represents either:

a divalent organic radical which is a straight or branched chain alkylene radical with less than 13 carbon atoms, a phenylene radical or cyclohexylene radical, a radical of one of the formulae:



wherein n represents an integer from 1 to 3, or a plurality of phenylene or cyclohexylene radicals joined to one another by a valency bond or by -O-, -S-, an alkylene group with 1 to 3 carbon atoms, -CO-, -SO_2-, -CONH-, -COO-, -P(O)R_1-, -CONH-X-NHCO-,



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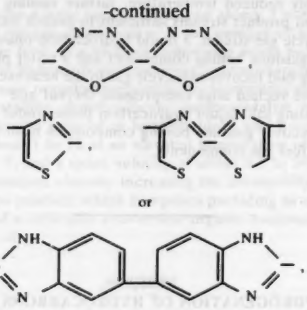
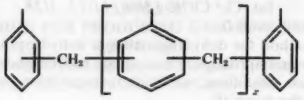


wherein R_1 represents a hydrogen atom, an alkyl radical with 1 to 4 carbon atoms, a phenyl radical or a cyclohexyl radical and X represents an alkylene radical with less than 13 carbon atoms, the phenylene or cyclohexylene radical being unsubstituted or substituted by methyl groups;

or a 2 to 4 valent radical of formula:



in which x is a number from 0.1 to 2,

A and B, which may be identical or different, represents a hydrogen atom, a methyl group or a chlorine atom,

the ratio of the number of NH_2 groups introduced by the polyamine to the number of imide groups introduced by the polyimide being from 1.05 to 2 at between 150° and 300° C.

3,998,905

POWER COATING BLEND OF EPOXY-FUNCTIONAL COPOLYMER AND A CARBOXY AND HYDROXY-FUNCTIONAL COPOLYMER

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,164, Dec. 19, 1973, Pat. No. 3,959,405. This application Feb. 18, 1976, Ser. No. 659,179

Int. Cl.² C08L *63/10*

U.S. Cl. 260—836 2 Claims

1. In a thermosettable powder paint which exclusive of pigments, catalysts, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

A. a carboxy-functional polymer,

B. an epoxy-functional copolymer of monoethylenically unsaturated monomers,

C. 0.05 to about 4 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture, the improvement wherein:

1. said carboxy-functional polymer has glass transition temperature in the range of about 40° C. to about 90° C. and molecular weight in the range of about 1500 to about 15,000, and is qualitatively difunctional copolymer of monoethylenically unsaturated monomers consisting essentially of about 5 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid selected from acrylic and methacrylic acid, about 2 to about 10 weight percent of a hydroxy acry-

late selected from the group consisting of hydroxyethyl acrylates and methacrylates, hydroxypropyl acrylates and methacrylates and hydroxybutyl acrylates and methacrylates, and about 70 to about 93 weight percent of monoethylenically unsaturated, quantitatively and qualitatively monofunctional monomers consisting essentially of esters of a C_1–C_8 monohydric alcohol and acrylic acid, esters of a C_1–C_8 monohydric alcohol and methacrylic acid and C_8–C_{12} monovinyl hydrocarbons, and

2. said epoxy-functional copolymer of monoethylenically unsaturated monomers is qualitatively monofunctional, has glass transition temperature in the range of about 40° C. and molecular weight in the range of about 1500 to about 15,000, and consists essentially of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid and about 80 to about 95 weight percent of other monoethylenically unsaturated monomers selected from the group consisting of esters of a C_1–C_8 monohydric alcohol and acrylic acid, esters of a C_1–C_8 alcohol and methacrylic acid and C_8–C_{12} monovinyl hydrocarbons.

3,998,906
ADHESIVE COMPOSITION

James T. Rice, and Chia M. Chen, both of Athens, Ga., assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 409,312, Pat. No. 3,927,140. Filed Jan. 21, 1975, Ser. No. 542,834

The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.

Int. Cl.² C08L *61/06*

U.S. Cl. 260—838 **5 Claims**

1. An aldehyde-phenolic condensation copolymer product formed by the method which comprises:

forming an essentially linear and non-cross-linkable aldehyde condensation prepolymer having a viscosity of 5 cps to 75 cps at 25° C by reacting an aldehyde selected from the group consisting of formaldehyde acetaldehyde, benzaldehyde, propionaldehyde, butyraldehyde, furfuraldehyde, and mixtures thereof with a phenolic compound selected from the group consisting of phenol, resorcinol, xylenol and cresol in a mole ratio of aldehyde to phenolic compound of 0.5 : 1 to 1.5 : 1 in water in amounts of 25% to 75% based on the total weight of materials in the presence of a catalyst of the hydroxide or carbonate compounds of alkali metals or alkaline earth metals, ammonium hydroxide or ammonium carbonate;

forming a highly thermosettable and cross-linkable aldehyde condensation prepolymer having a viscosity of 5 cps to 75 cps at 25° C by reacting said aldehyde with said phenolic compound in a mole ratio of aldehyde to phenolic compound of 2.0 : 1 to 3.0 : 1 in water in amounts of 25% to 75% based on the total weight of materials in the presence of said catalyst;

admixing from 90% to 10% by weight of said linear aldehyde prepolymer with 10% to 90% by weight of said highly thermosettable prepolymer; and

copolymerizing said admixture at a temperature of 60° C to the reflux temperature in the presence of said base in amounts of 0.05 to 0.8 moles per mole of phenolic compound which results in a copolymer having a viscosity of 30 to 3000 cps at 25° C.

3,998,907
RUBBER-MODIFIED DICARBOXYLIC ACID IMIDE COPOLYMERS

Adolph V. DiGiulio, Pittsburgh, Pa., assignor to Arco Polymers, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 284,683, Aug. 29, 1972, Pat. No. 3,840,499. This application Sept. 30, 1974, Ser. No. 510,266

The portion of the term of this patent subsequent to Oct. 8, 1991, has been disclaimed.

Int. Cl.² C08G *18/83*

U.S. Cl. 260—857 L **4 Claims**

1. A process for preparing a rubber-modified copolymer comprising (a) 5 to 40 weight percent of an elastomer and (b) 95 to 60 weight percent of a copolymer containing from 1 to 50 mole percent of an imide derivative of an ethylenically unsaturated dicarboxylic acid and 99 to 50 mole percent of one or more monomers copolymerizable therewith, said process comprising:

a. forming an aqueous suspension of (1) a rubbermodified copolymer comprising (a) 5 to 40 weight percent of an elastomer selected from the group consisting of homopolymers of conjugated 1,3-dienes, copolymers of said 1,3-dienes with up to 50 mole percent of one or more monoolefinically unsaturated monomers copolymerizable therewith, ethylenepropylene-diene terpolymer rubbers, acrylate-diene copolymer rubbers, and mixtures thercof, and (b) 95 to 60 weight percent of a copolymer in discrete particulate form containing 1 to 50 mole percent of a dicarboxylic moiety selected from the group consisting of an ethylenically unsaturated dicarboxylic acid, an ethylenically unsaturated dicarboxylic anhydride and an ethylenically unsaturated dicarboxylic acid half acid derivative, and mixtures thereof and 99–50 mole percent of one or more monomers copolymerizable therewith selected from the group consisting of a vinyl aryl monomer, an aliphatic alpha-monoolefin, an alkyl vinyl ether, a conjugated diolefin, an unsaturated nitrile, an acrylic monomer and mixtures thereof and (2) aqueous ammonia or an aqueous amine selected from the group consisting of alkyl amines having 1 to 4 carbon atoms in the alkyl group, allyl amine, ethanolamine, aniline, benzylamine, α,ω-alkylene diamines having 2 to 6 carbon atoms in the alkylene group, and arylene diamines in an amount sufficient to react stoichiometrically with the dicarboxylic moiety;

b. heating said suspension with agitation in a closed system at a temperature of between 125° and 200° C. at autogenous pressure for 0.5 to 48 hours to allow reaction between the ammonia or amine and the dicarboxylic moiety; and

c. separating the rubber-modified copolymer in discrete particulate form from the aqueous medium.

3,998,908
PROCESS FOR THE MANUFACTURE OF STABILIZED POLYESTER-POLYCARBONATE COPOLYMERS

Lothar Buxbaum, Lindenfels, Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,688

Claims priority, application Switzerland, Nov. 23, 1973, 16521/73

Int. Cl.² C08G *63/64*

U.S. Cl. 260—860 **17 Claims**

1. An improved process for the manufacture of thermoplastic polyesters containing carbonate groups and a stabilizer containing phosphorus from linear polyester precondensates which still contain hydroxyl groups, characterized in that linear polyesters containing hydroxyl groups and having a relative viscosity of at least 1.30, measured at 30° C on a 1% strength solution in equal parts of phenol and tetrachloroethane, are allowed to react with 0.01 to 45% by weight, based on the total amount, of a polycarbonate built up from diols of

which the hydroxyl groups are bonded to one or different aromatic radicals and which polycarbonate has a degree of polycondensation of at least 10, in the melt phase or solid phase, at a temperature of 170° to 320° C and in vacuo, in a stream of inert gas, or in vacuo and a stream of inert gas wherein the improvement comprises

increasing the relative viscosity of said thermoplastic polyesters by adding 1 to 15% by weight, based on the polyester precondensate, of a stabilizer containing phosphorus simultaneously with the addition of the polycarbonate.

3,998,909

MOLDING COMPOUNDS

Michael G. Roberts, Heath, and Charles E. Bolen, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 3, 1974, Ser. No. 502,691

Int. Cl.² C08L *67/06, 9/04, 9/08*

U.S. Cl. 260—862 **28 Claims**

1. A moldable composition comprising:

a. an unsaturated, crosslinkable thermosetting resin;

b. an ethylenically unsaturated first monomer;

c. a thermoplastic resin soluble in said first monomer, said thermoplastic resin comprising the reaction product of a second monomer with a mixture comprising first and second unsaturated elastomeric polymers, said first unsaturated elastomeric polymer having a weight average molecular weight within the range of from about 43,000 to about 38,000, said second unsaturated elastomeric polymer having a weight average molecular weight within the range of from about 500 to about 40,000, said thermoplastic resin being present in said moldable composition in an amount sufficient to improve at least one property of said thermosetting resin upon molding.

3,998,910

PROCESS FOR THE POLYMERIZATION AND COPOLYMERIZATION OF VINYL AND DIENE COMPOUNDS

Frantisek Hrabak; Vlasta Hynkova, and Milan Bezdek, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 143,225, May 13, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 389,533

Claims priority, application Czechoslovakia, May 14, 1970, 3332/70

Int. Cl.² C08L *23/00*

U.S. Cl. 260—878 R **8 Claims**

1. A process for polymerization or copolymerization of monomeric olefinic conjugated or unconjugated unsaturated organic compounds or their combinations comprising the step of mixing said monomeric olefinic unsaturated organic compound with an initiator system, said initiator system comprising (a) an organic peroxide selected from the group consisting of diacylperoxides, diarylperoxides, and dialkylperoxides, and (b) a polymeric or copolymeric tertiary amine selected from the group consisting of poly(dimethylaminoethylmethacrylate), poly(dimethylaminoethylacrylate), and poly(dimethylaminoethylacrylate-co-methacrylate), and polymerizing said mixture at a temperature of from about 20° to about 30° C until completion of the polymerization wherein the initiator system comprises from 0.01 to 5.0% by weight of said organic peroxide based on the monomeric compound and such an amount of amine that the molar ratio between peroxide and amine groups is within the range from 1:10 to 10:1.

3,998,911

POLYPROPYLENE MOLDING COMPOSITION AND PROCESS FOR ITS PREPARATION

Helmut Strametz; Hans Joachim Leugering; Kurt Rust, all of Frankfurt am Main, and Manfred Engelmann, Augsburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 7, 1975, Ser. No. 565,470

Claims priority, application Germany, Apr. 8, 1974, 2417093

Int. Cl.² C08F *297/08;* **C08L** *23/12*

U.S. Cl. 260—878 B **7 Claims**

1. A polypropylene molding composition consisting essentially of a mixture of from 70 to 90% by weight of polypropylene, 2 to 10% by weight of an ethylene/propylene copolymer and 8 to 25% by weight of a polyethylene, the melt index MFI 230/5 of the molding composition being less than that of the polypropylene contained therein and greater by the coefficient 1.3 to 7.0 than that of the polypropylene prepared by means of the same catalyst as the molding composition and having the same RSV

3,998,912

MANUFACTURE OF GRAFT COPOLYMERS

Gerhard Zeitler, Hessheim; Heinz Mueller-Tamm, Ludwigshafen, and Friedrich Urban, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Oct. 6, 1975, Ser. No. 619,782

Claims priority, application Germany, Oct. 25, 1974, 2450672

Int. Cl.² C08F *263/04, 265/02, 265/04*

U.S. Cl. 260—878 R **13 Claims**

1. A process for the manufacture of graft copolymers by grafting unsaturated carboxylic acids onto copolymers consisting of ethylene and unsaturated carboxylates in the presence of free-radical initiators, wherein shaped elements of the copolymers having diameters of from 0.05 to 1 cm are contacted in a mixing zone, at from 10° to 30° C, with from 0.5 to 10%, by weight of the copolymer, of unsaturated carboxylic acids containing free-radical initiator dissolved therein, whereupon the carboxylic acids containing initiator are allowed to diffuse into the copolymer and the mixture is then polymerized to completion at temperatures of from 50° to 100° C with the exclusion of air.

3,998,913

FLAME RETARDANT SYSTEMS

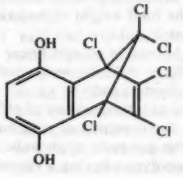
Julian R. Little, Hendersonville, N.C.; Walter Nudenberg, West Caldwell, N.J., and Yong S. Rim, Waterbury, Conn., assignors to Uniroyal Inc., New York, N.Y.

Division of Ser. No. 445,885, Feb. 26, 1974, Pat. No. 3,932,525, which is a division of Ser. No. 347,455, April 3, 1973, Pat. No. 3,832,422, which is a continuation-in-part of Ser. No. 80,747, Oct. 10, 1970, abandoned. This application June 6, 1975, Ser. No. 584,513

Int. Cl.² C08K *5/20, 5/34, 5/41*

U.S. Cl. 260—880 R **10 Claims**

1. A flame retardant composition comprising an acrylonitrile-butadiene-styrene polymer and an effective amount of a molecular complex of the formula:



wherein A is pyridine, pyridine oxide, pyridinium hydrochloride, pyridinium methobromide, pyridinium methoiodide, dimethylsulfoxide or dimethylformamide and *n* is 1 or 2.

3,998,914

FILM FROM A BLEND OF HIGH DENSITY POLYETHYLENE AND A LOW DENSITY ETHYLENE POLYMER

Rupert Martin Lillis, Mount Chesney, and Carmen Van Thomas, Beaconsfield, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Continuation of Ser. No. 324,372, Jan. 17, 1973, abandoned. This application Sept. 24, 1974, Ser. No. 508,889

Claims priority, application Canada, Feb. 1, 1972, 133717

Int. Cl.² C08L *23/06, 23/08*

U.S. Cl. 260—897 A **18 Claims**

1. High density polyethylene film of improved clarity and stiffness exhibiting a haze below about 10 percent, said polyethylene film being manufactured from a blend of polymers comprising (1) a high density ethylene homopolymer of density in the range about 0.950–0.965, of melt index less than about 10, and a stress exponent value less than 1.4, and (2) about 5 to 30% of a low density ethylene polymer of melt index in the range of about 0.1 to about 10 and of density in the range about 0.910–0.945, said low density ethylene polymer being an ethylene homopolymer having a stress exponent value greater than 1.4 or an ethylene-butene-1 copolymer containing a minor amount of butene-1.

3,998,915

PROCESS FOR THE PRODUCTION OF 1-ACYLOXY ALKYLENE PHOSPHONIC ACID DIALKYL ESTERS

Florin Seng, Schildgen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

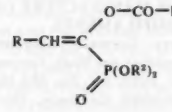
Filed June 9, 1975, Ser. No. 585,262

Claims priority, application Germany, June 29, 1974, 2431408

Int. Cl.² C07F *9/40*

U.S. Cl. 260—971 **6 Claims**

1. In the process for the production of a 1-acyloxy alkylene phosphonic acid dialkyl ester corresponding to the general formula (I)

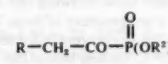


(I)

in which R represents hydrogen or a saturated aliphatic radical, and

R^1 and R^2 are the same or different and each represents a saturated aliphatic radical,

comprising reacting an α-oxo-alkane phosphonic acid dialkyl ester corresponding to the general formula (II)



(II)

in which R and R^2 are as just defined,

with a carboxylic acid anhydride in the presence of a basic catalyst, and recovering the resulting 1-acyloxy alkylene phosphonic acid dialkyl ester of formula (I), the improvement comprising using as basic catalyst pyridine.

3,998,916

METHOD FOR THE MANUFACTURE OF AN ELECTRET FIBROUS FILTER

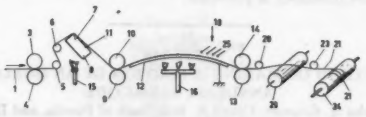
Jan van Turnhout, Delft, Netherlands, assignor to N.V. Verto, Rotterdam, Netherlands

Filed Mar. 25, 1975, Ser. No. 561,872

Claims priority, application Netherlands, Mar. 25, 1974, 7403975

Int. Cl.² B29D *27/00*

U.S. Cl. 264—22 **9 Claims**



1. A method for the manufacture of an electrically charged fibrous filter from a high molecular non-polar material, comprising the steps of:

continuously feeding a film of high molecular isotactic polypropylene material at a rate of 12.2 meters per minute;

stretching said film in two stages, said first stage of stretching stretches said film at a ratio of 1 : 6 at a temperature of approximately 110° C., said second stage of stretching stretches said film at a ratio of 1 : 1.5 at a temperature of substantially 130° C.;

homopolarly charging at least one side of the stretched film with a plurality of corona charging elements, said plurality of corona discharge elements being connected to minus 10 KV, said step of charging including the use of a metal plate connected to an opposite polarity voltage source and a grid whereby said charging corona elements are between said metal plate and said film, said metal plate being connected to a voltage of plus 3 KV, said grid being connected to a voltage of minus 2.3 KV, said corona charging elements being spaced substantially 5 mm from the means for supporting said film during said second stage of stretching;

fibrillating the charged film into fiber material;

collecting the fiber material; and

processing the collected fiber material into a filter.

3,998,917

CERAMIC COMPOSITIONS AND ARTICLES MADE THEREFROM

Robert Leonard Adelman, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 356,837, May 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 162,277, July 13, 1971, abandoned, which is a continuation-in-part of Ser. No. 850,617, Aug. 15, 1969, abandoned. This application Feb. 12, 1975, Ser. No. 549,205

Int. Cl.² C04B *35/64*

U.S. Cl. 264—63 **6 Claims**

1. In a process for preparing green flexible films by casting films on a supporting surface with dispersions of ceramic particulate matter, resins and liquid and drying to form a green sheet, the improvement of casting such films with a slurry composition adapted for the formation of flexible green ceramic articles which have an initial modulus below 20,000 psi and which have excellent dimensional stability and solvent resistance, said composition comprising ceramic particulate matter blended with an aqueous dispersion of an internally plasticized thermosetting resin, said resin containing from 0.1 to 10 weight percent of a comonomer which after polymerization is capable of cross-linking the polymer by heat treatment and (a) from 50 to 95 weight percent vinyl acetate, and from 4.9 to 49.9 weight percent of an internally plasticizing comonomer; (b) from 50 to 98 weight percent of an ester of a 1 to

8 carbon atom alcohol and acrylic acid and the remainder a plasticizing comonomer; or (c) from 50 to 84.9 weight percent ethylene and from 15 to 49.9 weight percent of a plasticizing comonomer, there being from 85 to 97 parts of said ceramic particulate matter and from 3 to 15 parts of said resin, the ceramic particulate matter having a particle size no larger than 44 microns then heating the film at from about 50 to about 150° C. to remove the aqueous medium and to cause the resin to cross-link whereby a flexible film loaded with ceramic particulate matter, having excellent dimensional stability and solvent resistance is provided.

3,998,918

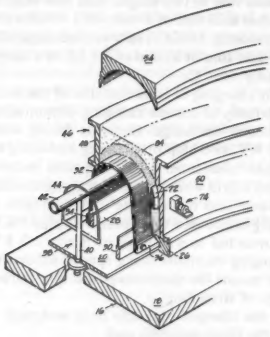
METHOD OF MAKING A PORTION OF AN HOLLOW, ANNULAR, SAND-CORE

Charles E. Grawey; Glenn A. Ball, both of Peoria, and Donald G. Zook, Metamora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 491,686, July 25, 1976, abandoned, which is a division of Ser. No. 370,204, June 15, 1973, Pat. No. 3,883,289. This application Jan. 16, 1976, Ser. No. 649,629

Int. Cl.² B29C *1/02*

U.S. Cl. 264—109 **2 Claims**



1. A method of forming a portion of an annular core from sand and a binder, comprising:

disposing two ring-like side-wall members in radially spaced, concentric relationship, with an annular inflatable bladder therebetween, on a base member;

placing a mixture of sand and a suitable binder about said bladder between said side-rings;

disposing an annular mold member between said side-rings and upon said mixture; inflating said bladder, shaping said mixture in a mold cavity formed by said side-walls, inflatable bladder and said annular mold member; curing said binder while said bladder is inflated, thereby forming said portion of an annular core.

3,998,919

PROCESS FOR THE MANUFACTURE OF PLASTIC PIRN SLEEVES

Thomas Urquhart, Whitby, Canada, assignor to Du Pont of Canada Limited, Montreal, Canada

Continuation of Ser. No. 332,189, Feb. 13, 1973, abandoned, which is a division of Ser. No. 117,013, Feb. 19, 1971, Pat. No. 3,752,414. This application Mar. 28, 1974, Ser. No. 455,806

Claims priority, application Canada, May 4, 1970, 81840

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B29D *15/00*

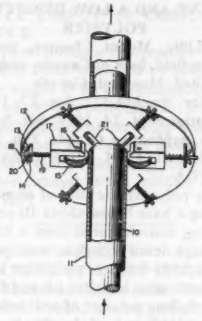
U.S. Cl. 264—150 **5 Claims**

1. A process for preparing a plastic pirn sleeve comprising:

a. extruding a thermoplastic material in the shape of a tube;

b. adjusting the temperature of the tube until its external surface is just above the softening point of the material and suitable for indenting;

c. indenting the external surface of the tube longitudinally along its length along at least three separate paths while maintaining the shape of the tube, said indentations being longitudinal rows about 1/32 to ½ inch wide of circumferential grooves spaced uniformly in the range of 30–70



grooves per inch said grooves having a lateral profile that is chordal or lunal with a maximum depth peak-to-valley of 0.002 to 0.010 inch and tapering at either end to be essentially flush with the blank areas between the longitudinal rows of indentations;

d. cooling the tube below the softening point of the material and

e. cutting the tube into predetermined lengths.

3,998,920

PROCESS FOR THE MANUFACTURE OF TIRE MONOFILAMENTS

Gunther Vock, Strassberg, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 28, 1974, Ser. No. 484,162

Claims priority, application Germany, Dec. 14, 1971, 2161967

Int. Cl.² D01D *5/12*

U.S. Cl. 264—210 F **7 Claims**

1. A process for the manufacture of high-tenacity monofilament from high molecular weight polyethylene terephthalate, which comprises spinning a raw material having an intrinsic viscosity of more than 0.67 (measured at 25° C. in a mixture of phenol/tetrachloro-ethane in a weight ratio of 3:2) and a content of terminal carboxy groups of less than 25 milliequivalents/kg into a water bath, drawing the monofilament obtained in water having a temperature of from 70° to 100° C. in a ratio of from 1:4.0 to 1:6.0, carrying out a second drawing at a temperature being 15° C. or less below the melting point of the polyethylene terephthalate to achieve a total drawing ratio of from 1:6.2 to 1:7.0, and setting the monofilament at a temperature being 15° C. or less below the melting point of the polyethylene terephthalate while allowing a shrinkage of less than 5.0%, the resulting monofilament having a diameter of 0.20 to 0.55 mm.

3,998,921

PROCESS FOR PRODUCTION OF POLYESTER THREADS

Armin Kohler, Dormagen; Bela von Falkai, Gohr, and Klaus Offermann, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 269,993, July 10, 1972, abandoned.
This application Dec. 11, 1973, Ser. No. 423,704
Claims priority, application Germany, July 10, 1971, 2134500
Int. Cl.² D01D 5/12
U.S. Cl. 264—210 F 4 Claims

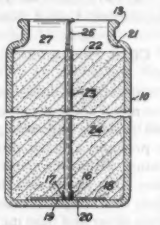
1. A process for the production of low shrinkage, highly oriented polyester monofilament having a diameter of 0.1 mm to 5 mm, which consists essentially of (1) melt spinning a fiber forming polyester having a relative viscosity of about 1.75 as measured in a 1% solution in 0-chlorophenol at 15° C; said polyester being derived from ethylene glycol and a dicarboxylic acid, at least 90% by weight of said acid being terephthalic acid; (3) stretching said monofilament in hot water at a temperature of 70°–100° C at a ratio of 1:4 to 1:6; and (3) thereafter shrinking said monofilament from 3% to 22% in hot air at a temperature of from 5° to 40° C below the melting point of said polyester over a period of 3 to 30 seconds.

3,998,922

METHOD OF MAKING A CANDLE IN A CONTAINER

Theodore H. Weiss, 7250 Schultz Road, Erie, Pa. 16509

Filed Jan. 28, 1976, Ser. No. 653,207
Int. Cl.² B29D 3/00
U.S. Cl. 264—255 4 Claims



1. The method for making a candle in an open topped jar comprising:

introducing a solidifiable fuel into said jar;

frictionally engaging an end portion of a rod between plural, spaced projecting portions of a plate and inserting a portion of said rod with said plate supported thereon into said fuel in said jar; allowing said fuel to solidify around said plate and said rod; removing said rod from said plate and said fuel leaving an aperture in said fuel;

inserting a wick into said aperture and between said spaced projecting portions;

and adding additional said fuel to raise the level thereof to compensate for shrinkage and to seal said wick in place; thereby forming said candle.

3,998,923

METHOD FOR MAKING OBJECTS FROM PLASTICS BY MEANS OF COMPRESSION MOULDING

Hans-Jurgen Merkle, Conrad-Celtis-Str. 19, 8 Munich 70, Germany

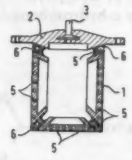
Filed May 28, 1974, Ser. No. 473,834
Claims priority, application Germany, May 30, 1973, 2327627
Int. Cl.² B29F 5/00; B29G 1/00
U.S. Cl. 264—314 3 Claims

1. A method of making objects having no undesired pockets or sunk spots therein from plastics material, said method comprising the steps of:

a. providing a molding tool having a cavity therein and having flexible and expansible zones forming a portion of an interior cavity defining surface;

b. disposing said plastics material in said cavity of said molding tool and applying and maintaining molding pressure on said plastics material by expansion of said zones;

c. cooling said plastics material in said cavity across the entire exterior surface thereof and across that portion of the interior surface thereof which is not in the region of



said flexible and expansible zones to solidify said plastics material;

d. heating, simultaneously with step (c), said plastics material only in the region of said flexible and expansible zones to prevent formation of a through solidified zone in said plastics material; and

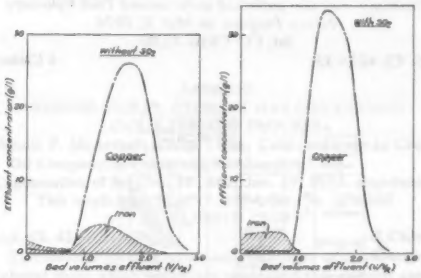
e. cooling said plastics material in the region of said flexible and expansible zones in the last phase of solidification of said plastics material.

3,998,924

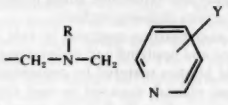
RECOVERY OF NON-FERROUS METALS FROM ACIDIC LIQUORS WITH A CHELATE EXCHANGE RESIN IN PRESENCE OF IRON(III)

Kenneth C. Jones, and Robert M. Wheaton, both of Walnut Creek, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 4, 1975, Ser. No. 601,872
Int. Cl.² C01G 9/00, 43/00, 3/00, 53/00
U.S. Cl. 423—7 12 Claims



1. In the process and for the recovery of non-ferrous transition metals from an acidic hydrometallurgical leach liquor containing ferric iron and nonferrous transition metal values selected from the group consisting of copper, nickel, cobalt, zinc, vanadium, uranium, and cadmium at a pH of about 1.0–5.0 with (2) a water-insoluble chelate exchange resin having a crosslinked polymer matrix and pendent thereto a plurality of methylene-2-picolylamine groups of the formula

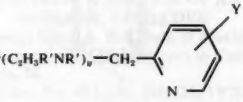


wherein Y is H or C_1-C_4 alkyl; and

R is

a. H, C_1-C_4 alkyl, or C_2-C_4 hydroxyalkyl

b. allyl, benzyl or o-hydroxybenzyl;



wherein each R′ is H or CH_3 and Y is 0 or 1;

d. $-(CH_2)_mOY$ where m is 2 or 3;

e. $-C_2H_3R'NR_1R_2$ where R′ is H or CH_3, R_1 is H, C_1-C_4 alkyl, C_2-C_4 hydroxyalkyl, phenyl or benzyl, and R_2 is H, C_1-C_4 alkyl or C_2-C_4 hydroxyalkyl;

f. $-C_2H_4SR'''$ where R′′′ is C_1-C_4 alkyl;

g. $-C_nH_{2n}COOY$ where n is 1 or 2;

h. $-C_nH_{2n}SO^-_3$ where n is 1 or 2; or

i. $-CH_2Z$ where Z is $-CONH_2$ or $NHCONH_2$;

in the presence of (3) at least about 0.3 mole/mole ferric iron of a water-soluble reducing agent selected from the group consisting of SO_2, H_2SO_3, HCHO, paraformaldehyde, NH_2OH or a water-soluble salt thereof to concurrently reduce the ferric iron and extract the non-ferrous transitional metal values; and

B. Regenerating the 2-picolylamine resin to recover an enriched non-ferrous transition metal product solution.

3,998,925

PRODUCTION OF AMMONIUM DIURANATE

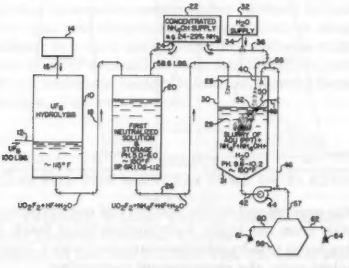
Robert R. Fuller, Columbia, S.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 22, 1973, Ser. No. 372,722

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² C01G *43/00*

U.S. Cl. 423—15 **4 Claims**



1. The process of continuously converting uranium hexafluoride (UF_6) to ammonium diuranate (ADU) which is calcinable to good ceramic quality UO_2, comprising the steps of

a. dissolving the UF_6 in water to produce an aqueous acidic hydrolysis solution containing UO_2F_2 and HF,

b. partially neutralizing the aqueous hydrolysis solution with concentrated ammonium hydroxide, from about 24 to 29% NH_3, to a pH of from 5.0 to 6.0,

c. conveying the partially neutralized hydrolysis solution to a precipitation vessel where sufficient additional concentrated ammonium hydroxide is added to bring the pH to a value of from 9.8 to 10.2 to cause the UO_2F_2 to form ADU as a precipitate suspended in the aqueous solution with substantially all of the fluoride being converted to NH_4F,

d. withdrawing the precipitate suspension from the lower portion of the precipitation vessel and injecting a stream thereof forcefully under pressure into the suspension liquid, the stream being injected in the vicinity of the liquid surface and at an angle of from about 30° to 60° to the horizontal, the withdrawal and return of the suspension being at a rate of the order of a gallon a minute to effect a complete turnover of the precipitation vessel suspension in a period of the order of a minute, the injected stream causing violent agitation and circulation of the suspension in the precipitation vessel so that ADU precipitate particles of high surface area are produced,

e. a small portion of the suspension in the precipitation vessel being continuously withdrawn and the ADU particles therein are substantially dewatered to provide a sludge comprising at least about 35% ADU by weight.

3,998,926

TREATMENT OF MATERIAL WITH HYDROGEN CHLORIDE

Raymond Edward Oliver, Johannesburg, South Africa, and George McGuire, London, England, assignors to Matthey Rustenburg Refiners (Pty) Ltd., Johannesburg, South Africa

Filed Mar. 18, 1975, Ser. No. 559,423

Claims priority, application United Kingdom, Mar. 21, 1974, 12598/74

Int. Cl.² C01G *7/00, 5/00, 55/00*

U.S. Cl. 423—22 **8 Claims**

1. A process for the separation of components of base metal and silver from precious metal components in mineral concentrates which comprises reacting together gaseous hydrogen and chlorine so as to produce a flame providing a reaction zone having a temperature within the range 900° to 2500° C, passing into the reaction zone of the said flame the said mineral concentrate in finely divided particulate form to obtain a reaction product wherein silver and base metal in said concentrate are converted to their volatile chlorides while the precious metal components in said concentrate remain in a solid, water-insoluble form and separating the silver and base metal chlorides from the water-insoluble solids in the reaction product, said base metal being selected from the group consisting of Sb, Sn, Pb, Zn, Cu, Ni, Fe and As.

3,998,927

RECOVERY OF SODIUM ALUMINATE FROM HIGH-SILICA ALUMINOUS MATERIALS

Lawrence Keith Hudson, Oakmont, Pa., and Thomas G. Swansiger, St. Louis, Mo., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 20, 1975, Ser. No. 623,930

Int. Cl.² C01F *7/06*

U.S. Cl. 423—119 **5 Claims**

1. In a process for extraction of alumina from highly siliceous aluminous-bearing materials by caustic and lime digest of the materials, the improvements which comprise:

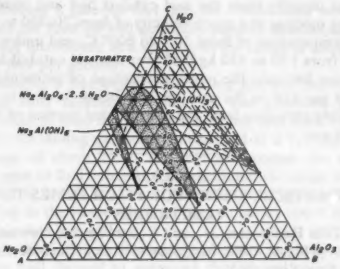
a. evaporating the digest solution until the concentration of the solution reaches the shaded portion of the phase diagram in FIG. 2 labeled $Na_2Al_2O_4.2.5H_2O$;

b. seeding the evaporated solution with $Na_2Al_2O_4.2.5H_2O$ crystals and cooling to crystallize alumina from the solution as $Na_2Al_2O_4.2.5H_2O$;

c. separating the $Na_2Al_2O_4.2.5H_2O$ crystals from the resultant mother liquor solution; and

d. washing the $Na_2Al_2O_4.2.5H_2O$ crystals with a caustic

liquid having a lower caustic content than the mother liquor and an alumina concentration of about 50 grams

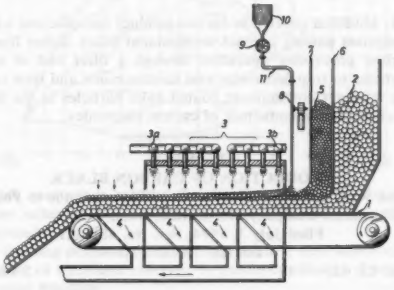


per liter to remove any mother liquor remaining on said crystals.

3,998,928
PROCESS FOR CALCINING PELLET-SHAPED CALCIUM HYDROXIDE

Joachim Stendel, Hurth-Knapsack; Wilhelm Portz, Erftstadt Kierdorf; Georg Strauss, Erftstadt Lechenich; Heinrich Weiler, Hurth-Hermulheim; Günther Moormann, Bruhl-Vochem, and Horst Witt, Erftstadt Liblar, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 12, 1975, Ser. No. 549,175
Claims priority, application Germany, Feb. 16, 1974, 2407506
Int. Cl.² C01F *11/04*
U.S. Cl. 423—155 **15 Claims**

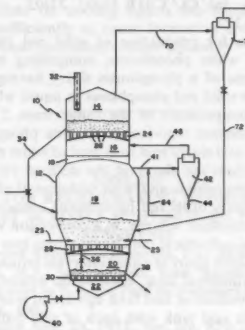


1. A process for calcining pellet-shaped calcium hydroxide forming part of the mixture of flux and ores in electrothermal calcium carbide furnces, the pellets being made by granulating or briquetting moist calcium hydroxide, being delivered to a sintering grate and being conveyed thereon through a heating zone, wherein high temperatures are produced by the combustion of gas, above the grate, and wherein the combustion gas is exhausted, below the grate, which process comprises placing calcium hydroxide pellets containing between about 10 to 25% by weight of free water on to the grate, convering them with a layer of broken limestone and directly conveying the undried pellets through the heating zone to effect a temporary and superficial carbonization of the calcium hydroxide so as to have decarbonized limestone and dehydrated calcium hydroxide at the discharge end of the heating zone.

3,998,929
FLUIDIZED BED PROCESS

David W. Leyshon, Westport, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Oct. 30, 1972, Ser. No. 302,078
Int. Cl.² C01F *1/00, 5/00, 11/00*
U.S. Cl. 423—167 **7 Claims**



1. A calcining process for the treatment of particulate phosphate rock in a succession of fluidized beds comprising, fluidizing and treating the material at an elevated temperature in a preheat compartment, transferring the material to a fluidized bed calcining compartment for treatment at a higher temperature of at least about 650° C, injecting fuel into said fluidized bed calcining compartment to maintain said temperature, conducting the hot off-gases from said calcining compartment through an external conduit to a cooling station at which water is injected into the gas stream to cool the gases to a temperature below that at which deleterious scaling occurs, passing the cooled gases through a cyclone to remove entrained solids and employing the cooled and cleaned gas as the fluidizing gas for said preheat compartment.

3,998,930
IRIDIUM-NICKEL EXHAUST GAS CONVERSION CATALYST AND PROCESS

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 327,862, Jan. 29, 1973, abandoned. This application May 17, 1974, Ser. No. 470,680
Int. Cl.² B01D *53/34*
U.S. Cl. 423—213.5 **4 Claims**

1. A method for the conversion of nitrogen oxides in engine exhaust gases which comprises contacting said exhaust gases under net reducing conditions and at conversion temperatures above about 900° F with a catalyst consisting essentially of an effective catalytic amount of a dispersed nickel component and an effective catalytic amount of a dispersed iridium component, said nickel and iridium components being supported on a shaped, porous, cohesive aggregate of crystalline aluminum borate having a surface area between about 5 and 100 m^2/g and a porosity between about 0.3 and 1.0 ml/g, and wherein the weight ratio of B_2O_3/Al_2O_3 is between about 8/92 and 25/75, said aggregate having been formed by calcining a preshaped composite of alumina and boria, or boria precursor, at temperatures between about 1250° and 2600° F for a sufficient time to produce said crystalline aluminum borate.

3,998,931

PROCESS FOR CONTINUOUS CONVERSION OF LIQUID WHITE PHOSPHORUS TO RED PHOSPHORUS IN AGITATED SLURRY

Daniel Hyman, Greenwich, Conn., and John Donald Chase, Mississauga, Canada, assignors to American Cyanamid Company, Stamford, Conn.

Filed June 30, 1975, Ser. No. 591,908
Int. Cl.² C01B *25/01, 25/02*
U.S. Cl. 423—322 **1 Claim**

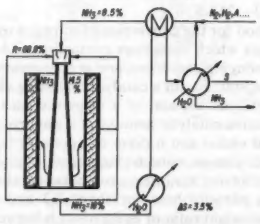
1. A process for production of solid red phosphorus by conversion of white phosphorus, comprising maintaining a constant volume of a phosphorus slurry having from 15 to 45% by weight solid red phosphorus in liquid white phosphorus at slurry temperature in the range from 220° C. up to boiling with constant conversion of white phosphorus to red phosphorus in said slurry and with feed of white phosphorus at a rate to maintain the slurry at the defined red phosphorus percentage composition and with withdrawal of part of said slurry for recovery of its red phosphorus content at a rate to maintain said constant volume, in a conversion vessel consisting of a vertical cylindrical tank having from two to six vertical wall baffles spaced apart at equal intervals around the interior wall of said cylindrical tank, each baffle extending vertically from near the bottom of said tank upward at least to the liquid surface level in said tank with each of said baffles offset inward from the tank wall from ½ to 2 inches and having baffle width measured radially in the cylinder from 1/15 to ⅛ of the tank diameter, and with one to three turbine impellers mounted coaxially in said cylindrical tank on a rotatable vertical shaft, with the bottom impeller having vanes for pumping liquid downward in said tank and with each additional one of said impellers having vanes for pumping liquid either downward or radially in said tank, the diameter of said impellers being from 0.3 to 0.5 of the tank diameter and the bottom impeller being mounted above the tank bottom a distance, on center, from 0.3 to 0.8 of the impeller diameter and with vertical distance on center between adjacent ones of said impellers from 0.9 to 1.5 of the impeller diameter, and with all of said impellers rotating constantly, below the liquid surface level of said slurry, at peripheral speed from 600 to 1000 ft. per min. for constant agitation of said slurry in said conversion vessel.

3,998,932

PROCESS FOR THE CATALYTIC SYNTHESIS OF AMMONIA

Amilcare Collina; Emanuele Malfatti, and Antonio Cappelli, all of Milan, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Continuation of Ser. No. 359,355, May 11, 1973, abandoned. This application Feb. 28, 1975, Ser. No. 554,192
Claims priority, application Italy, May 15, 1972, 24342/72; Nov. 20, 1972, 31854/72; Dec. 22, 1972, 33455/72
Int. Cl.² C01C *1/04*
U.S. Cl. 423—362 **3 Claims**



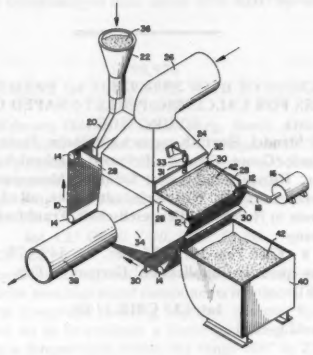
1. A process for manufacturing ammonia with only one catalyst bed which comprises flowing over said catalyst bed containing iron a gaseous feed stream containing nitrogen and hydrogen at a space velocity, temperature and pressure which produce an effluent gas from the said catalyst bed which contains at least 12 molar percentage of ammonia, mixing the said feed stream with from 30 to 80% of said effluent gas recycled directly from the said catalyst bed and passing the resulting mixture at a space velocity of from 20,000 to 70,000 h^{-1}, a temperature of from 300° to 600° C, and under a pressure of from 150 to 450 kg/cm² over the said catalyst bed, the difference between the molar percentage of ammonia in the effluent gas and in the said mixture being from 3 to 6, and recovering ammonia from the nonrecycled portion of the said effluent gas.

3,998,933

COKE PARTICLE FILTER FOR PITCH FUMES TO FORM ELECTRODES

James Tillit Henderson, Jr., and Robert Burton Newman, both of Bay Village, Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 16, 1974, Ser. No. 506,535
Int. Cl.² C01B *31/04*
U.S. Cl. 423—448 **18 Claims**



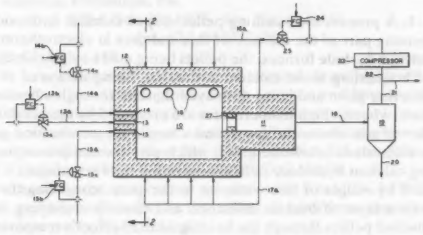
1. Modified process in carbon product manufacture which comprises passing aerosol contaminant laden fumes from a carbon processing operation through a filter bed of coke particles to trap and retain said contaminants and then using the resultant contaminant coated coke particles in the feedstock for the manufacture of carbon electrodes.

3,998,934

PRODUCTION OF CARBON BLACK

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 3, 1974, Ser. No. 485,421
Int. Cl.² C01C *1/50*
U.S. Cl. 423—455 **5 Claims**



1. A method of producing carbon black which comprises:

introducing a feed oil into a generally cylindrical combustion zone in a direction generally along the axis of the combustion zone and at a velocity in the range of about 20 to 50 feet per second;

introducing a gaseous fuel into the combustion zone adjacent the feed oil and generally parallel thereto, said fuel being introduced at a velocity in the range of about 20 to 50 feet per second;

introducing a free oxygen-containing gas into the combustion zone adjacent the feed oil and generally parallel thereto to support combustion of the fuel, said free oxygen-containing gas being introduced at a velocity in the range of about 70 to 200 feet per second, the ratio of oxygen to fuel being in the stoichiometric range of about 0.8:1 to about 2.5:1, and the ratio of oxygen to feed oil being in the range of about 60:1 to about 600:1 standard cubic feet per gallon;

introducing inert gas into said combustion zone adjacent the side wall thereof to surround the central region of the combustion zone, said inert gas being relatively cool to quench the reaction products;

passing the effluent from said combustion zone into a reaction zone; and

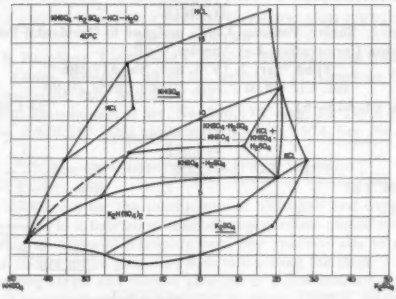
withdrawing carbon black and gases from the reaction zone.

3,998,935

MANUFACTURE OF POTASSIUM SULFATE

Ben E. Adams, Hanford, Calif.; John B. Sardisco, Shreveport, La., and Erhart K. Drechsel, Houston, Tex., assignors to Pennzoil Company, Shreveport, La.

Filed Jan. 30, 1975, Ser. No. 545,554
Int. Cl.² C01D *5/02*; C01B *7/08*
U.S. Cl. 423—552 **12 Claims**



6. A continuous method for the formation of potassium sulfate substantially free from double salts thereof, which comprises:

1. reacting potassium chloride and sulfuric acid with evolution of hydrogen chloride to produce a slurry of potassium bisulfate;
2. recovering the solid potassium bisulfate;
3. dissolving at least a portion of the potassium bisulfate in an excess of water to form an aqueous solution containing potassium bisulfate;
4. heating said aqueous solution to a temperature of about 65°–110° C.;
5. adding potassium chloride to said aqueous solution to react with said potassium bisulfate, the amount of potassium chloride being added ranging from a substantially molar equivalent amount up to about 15% molar excess, but wherein the maximum chloride content of the resulting solution is maintained below about 6–8 wt. %;
6. continuing the reaction at a temperature of about 65°–110° C. until complete solution is achieved;
7. cooling the resulting solution to a temperature of about 40°–60° C.;
8. permitting the resulting said potassium sulfate to crystallize from solution;
9. recovering the solid potassium sulfate from the solution;
10. evaporating excess water from the solution to provide a mother liquor concentrate; and
11. recycling the mother liquor concentrate to step (1) as reaction medium for potassium bisulfate formation;

wherein crystallization and initial precipitation of the potassium sulfate on cooling upsets the equilibrium of the system sufficiently to cause formation and precipitation of additional potassium sulfate product.

3,998,936

PROCESS FOR REGENERATING HYDROGENATION CATALYST ACTIVITY IN HYDROGEN PEROXIDE SYNTHESIS

Richard Edward Ernst, Cochranville, Pa.; Bijan Amini, Port Monmouth, N.J., and William John Bareford, Memphis, Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 23, 1975, Ser. No. 570,720
Int. Cl.² C01B *15/02*
U.S. Cl. 423—588 **3 Claims**

1. In a continuous cyclic process for making hydrogen peroxide in which

1. a working solution of alkylanthraquinone dissolved in water-immiscible solvent having a platinum group metal catalyst dispersed therein is hydrogenated to convert the anthraquinone to anthrahydroquinone;
2. the catalyst is removed from the working solution;
3. the catalyst-free working solution is oxidized to form hydrogen peroxide and reconvert the anthrahydroquinone to anthraquinone;
4. the oxidized working solution is solvent extracted to remove hydrogen peroxide therefrom; and
5. the extracted anthraquinone-containing working solution is recycled to the hydrogenation step,

the improvement comprising continuously

a. withdrawing a sidestream of the catalyst-containing working solution from step (1);

b. combining the sidestream of working solution from step (1) with a sidestream of extracted working solution from step (5) in the absence of hydrogen in an amount sufficient to provide 0.002–0.040 mole hydrogen peroxide per liter of combined solution; and

c. returning the combined working solutions to step (1) of the process.

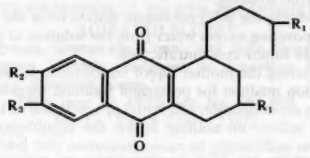
3,998,937

1-ALKYL-SUBSTITUTED-1,2,3,4-TETRAHYDROANTHRAQUINONES

Lawrence G. Vaughan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

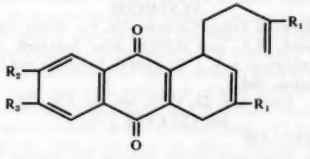
Division of Ser. No. 451,116, March 14, 1974, Pat. No. 3,962,288, which is a continuation of Ser. No. 264,579, June 20, 1972, abandoned. This application Apr. 30, 1976, Ser. No. 682,053
Int. Cl.² C01B *15/02*
U.S. Cl. 423—588 **8 Claims**

1. In a cyclic process for the production of hydrogen peroxide by oxidation and reduction of alkylated anthraquinones dissolved in mixed solvents, the improvement comprising employing as an anthraquinone an alkyl-substituted-1,2,3,4-tetrahydroanthraquinone of the formula



wherein R_1 is hydrogen or an alkyl group containing 1–10 carbon atoms and R_2 and R_3 are hydrogen or alkyl groups containing 1–6 carbon atoms.

8. In a cyclic process for the production of hydrogen peroxide by oxidation and reduction of alkylated anthraquinones dissolved in mixed solvents, the improvement comprising adding to the hydrogenator a compound of the formula



wherein R_1 is an alkyl group containing 1–10 carbon atoms and R_2 and R_3 are hydrogen or alkyl groups containing 1–6 carbon atoms.

3,998,938

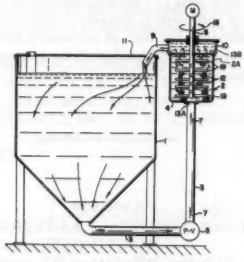
METHOD AND APPARATUS FOR GRINDING PARTICULATE SOLIDS

Andrew Szegvari, Akron, Ohio, assignor to Union Process International, Inc., Akron, Ohio

Continuation-in-part of Ser. No. 387,354, Aug. 10, 1973, abandoned, which is a continuation-in-part of Ser. No. 360,466, May 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 166,421, July 27, 1971, abandoned. This application May 10, 1974, Ser. No. 468,270

Int. Cl.² C01G *49/02*

U.S. Cl. 423—594 **57 Claims**



1. A method of grinding solids comprising the steps of:

A. providing a batch of particulate solids to be ground suspended in a liquid continuum;

B. repeatedly circulating the liquid continuum containing suspended solids sequentially through pump means and a comminuting means at a streaming speed of at least about 30 volumes of liquid continuum containing solids in the comminuting means per hour;

C. grinding said solids in the comminuting means as the liquid continuum containing solids steadily passes through the comminuting means; and

D. continuing steps B and C until the solids in the batch are reduced to desired particle size.

3,998,939

PRODUCTION OF BETA-LITHIUM ALUMINATE ($LiAlO_2$)

David M. Mason, Chicago, and Cornelius J. VanDrunen, South Holland, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Aug. 20, 1975, Ser. No. 606,060

Int. Cl.² C01F *7/04*

U.S. Cl. 423—600 **14 Claims**

1. A low pressure process for the production of beta-lithium aluminate ($LiAlO_2$) in a two thermal stage reaction of alumina with liquid phase lithium carbonate comprising:

admixing powdered alumina with a carbonates composition selected from the group consisting of a ternary lithium-potassium-sodium carbonates composition, a binary lithium-potassium carbonates composition and a binary lithium-sodium carbonates composition, said carbonates composition being liquid at reaction temperatures;

heating said admixture at about 480° to 550° C. in a first thermal stage for a period of time to react the alumina with lithium carbonate to form lithium aluminate;

raising the temperature of said lithium aluminate to about 600° to 650° C. in a second thermal stage for a period of time to transform said lithium aluminate to the desired beta-lithium aluminate.

3,998,940

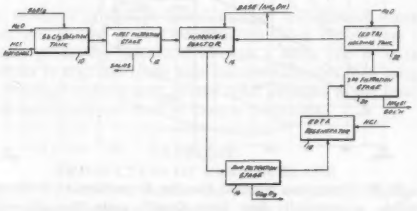
PROCESS FOR THE PRODUCTION OF LIGHT STABLE ANTIMONOUS OXIDE BY HYDROLYSIS OF ANTIMONY TRICHLORIDE IN THE PRESENCE OF COMPLEXING AGENTS

John L. Shafer, Pomona, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Mar. 2, 1973, Ser. No. 337,306

Int. Cl.² C01B *27/00, 29/00;* **C01G** *29/00*

U.S. Cl. 423—617 **34 Claims**



1. A process for the production of the senarmontite from antimony trichloride which comprises:

a. adding antimony trichloride to a hydrolysis reaction zone containing an aqueous solution of at least one organic antimony complexing agent present to prevent the formation of valentinite and which is capable of coupling with Sb^{+++} and intermediate antimony hydrolysis species but incapable of coupling with antimonous oxide and antimony hydroxide, the mole ratio of antimony trichloride to total antimony complexing agent dissolves in solution being less than about five;

b. reacting the antimony trichloride in the presence of said antimony complexing agent and a base to hydrolyze the antimony trichloride to cubic antimonous oxide as senarmontite at an aqueous solution temperature from the freezing point of the aqueous solution to about 100° C and at a pH from about 7 to about 10;

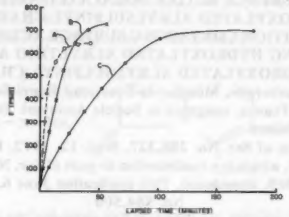
c. separating the cubic antimonous oxide from the hydrolysis reaction zone.

3,998,941

PREPARATION OF ALKALI METAL HYDRIDES

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Oct. 4, 1974, Ser. No. 512,120
Int. Cl.² C01B 1/00
U.S. Cl. 423—646 25 Claims



1. A process for producing alkali metal hydrides which comprises reacting alkali metal and hydrogen in the presence of a catalytic amount of at least about 0.001 percent by weight of alkali metal aluminum dihydrocarbon dihydride based on the alkali metal reactant fed to the process and in the presence of an inert solvent for the alkali metal aluminum dihydrocarbon dihydride, under conditions suitable to form alkali metal hydride, thereby producing alkali metal hydride.

3,998,942

PROCESS FOR PRODUCING HYDROGEN AND OXYGEN FROM WATER

Jon B. Pangborn, Lisle; John C. Sharer, Evanston, and Robert H. Elkins, Hinsdale, all of Ill., assignors to American Gas Association, Inc., Arlington, Va.

Continuation-in-part of Ser. No. 390,178, Aug. 20, 1973, Pat. No. 3,939,257. This application Dec. 23, 1974, Ser. No. 536,014
Int. Cl.² C01B 1/02, 1/05, 7/08, 13/00
U.S. Cl. 423—658 12 Claims

1. A process for the production of hydrogen and oxygen from water in a four zone reactant regenerative closed cycle wherein all material transport from one reaction site to another occurs in the gaseous phase comprising the steps:

reacting steam and ferrous chloride in a first reaction zone at temperatures of about 450° to about 1500° C. to produce ferriferrous oxide, hydrogen chloride and hydrogen and removing the hydrogen from the cycle;

reacting solid ferriferrous oxide and hydrogen chloride in a second reaction zone at temperatures of about 125° to about 300° C. to produce ferric chloride, ferrous chloride and steam, providing the ferrous chloride and the steam to the first reaction zone and the ferric chloride to a third reaction zone;

thermally reducing ferric chloride in a third reaction zone at temperatures of about 225° to about 325° C. to produce ferrous chloride and chlorine, said chlorine product being removed from the reaction zone while maintaining a vapor pressure of dimer Fe_2Cl_6 in the zone of a solid ferric chloride reactant and providing the ferrous chloride to the first reaction zone and the chlorine to a fourth reaction zone; and

providing water to a fourth reaction zone and reacting with chlorine at temperatures above about 650° C. to produce oxygen and hydrogen chloride, providing the hydrogen chloride to a second reaction zone and removing oxygen from the cycle.

3,998,943

DOUBLE RECEPTOR FLUORESCENT IMMUNOASSAY

Edwin F. Ullman, Atherton, Calif., assignor to Syva Company, Palo Alto, Calif.

Filed Oct. 2, 1973, Ser. No. 402,693
Int. Cl.² G01N 21/00, 33/16
U.S. Cl. 424—12 17 Claims

1. A method for detecting the presence of a ligand in a sample comprising:

combining in a aqueous medium said sample;

1. ligand analog-fluorescer, wherein said ligand analog has at least one common epitope with said ligand so as to be specifically recognizable by a common antibody, and the ligand analog and fluorescer are linked sufficiently close by a linking group, so that the simultaneous binding of antibody to ligand and antibody to fluorescer is sterically inhibited;

2. antiligand and (3) antifluorescer;

determining at at least one wavelength the intensity of the fluorescence from said medium related to the emission of said fluorescer or said fluorescer bond to (3) said antifluorescer, as compared to a standard having a known amount of ligand.

3,998,944

FUNGICIDAL PAPER

William Joseph Long, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 280,629, Aug. 17, 1972, abandoned. This application May 8, 1974, Ser. No. 468,613
Int. Cl.² D21H 5/22
U.S. Cl. 424—29 4 Claims

1. A fungicidal porous paper cover sheet for gypsum wallboard having a uniform surface coating of metal quinolinolate in a binder, which coating provides uniform surface fungistatic properties, where the coating results from coating the paper cover sheet with a stable aqueous dispersion consisting essentially of

3–30%, on a fungicidal active weight basis, of a metal salt of a hydroxyquinoline,

3–30% solids of a binder selected from the group consisting of a wax, rosin, acrylic resins, styrene, butadiene-styrene, butadiene-acrylonitrile and polyethylene resins each in the form of an emulsion,

a minor amount of a colloidal suspending agent selected from the group consisting of xanthan gum, methylcellulose, carboxymethylcellulose, and an alginate, said amount being an amount sufficient to prevent settling, while providing a dispersion viscosity not substantially greater than 300 centipoises and evaporating the water.

3,998,945

DENTAL TREATMENT

Jeroslav Vit, Belle Mead, N.J., assignor to National Patent Development Corporation, New York, N.Y.

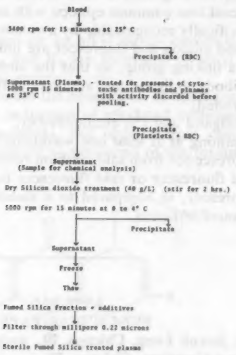
Division of Ser. No. 301,163, Oct. 26, 1972, Pat. No. 3,932,605. This application June 24, 1975, Ser. No. 589,683
Claims priority, application United Kingdom, June 29, 1972, 30611/72; June 12, 1972, 27443/72; Aug. 24, 1972, 39588/72; Aug. 24, 1972, 39589/72
The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.
Int. Cl.² A61K 7/20
U.S. Cl. 424—53 11 Claims

1. An aqueous composition consisting essentially of water, an N-haloamino-alkanoic acid having 2 to 11 carbon atoms, said halogen having an atomic weight of 35 to 127 and a sufficient amount of an alkali metal phosphate or borate buffer to maintain the pH at 8 to 12.

3,998,946
FIBRINOGEN-FREE PLASMINOGEN-PLASMIN-FREE PLASMA AND METHOD OF PREPARING AND USING SAME

Richard M. Condie, Minneapolis, and Luis H. Toledo-Pereyra, Hopkins, both of Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed Apr. 23, 1975, Ser. No. 570,569
Int. Cl.² A61K *35/16, 35/14*
U.S. Cl. 424—101 **12 Claims**


Blood
3400 rpm for 15 minutes at 25° C
Precipitate (RBC)
Supernatant (Plasma) - 5000 rpm 15 minutes at 25° C
tested for presence of cytotoxic antibodies and plasma with activity discarded before pooling.
Precipitate (Platelets + RBC)
Supernatant (Sample for chemical analysis)
Dry Silicon dioxide treatment (40 g/L) (stir for 2 hrs.)
5000 rpm for 15 minutes at 0 to 4° C
Precipitate
Supernatant
Freeze
Thaw
Fumed Silica fraction + additives
Filter through millipore 0.22 microns
Sterile Fumed Silica treated plasma

1. The method of treatment to remove fibrinogen without polymerization to fibrin, to remove the plasminogen-plasmin enzyme system, and to remove lipoproteins and lipids from blood plasma and plasma fractions containing the same, which method comprises:

A. intimately admixing finely divided sterile fumed silica containing siloxan and silanol groups at its surface with a blood plasma product selected from the class consisting of blood plasma and plasma fractionation products, and

B. separating the silica and associated fibrinogen, plasminogen-plasmin, lipoprotein and lipids from the remaining plasma product.

3,998,947
PROCESS FOR OBTAINING A PLASMINOGEN ACTIVATOR

Lucien Dussourd D'Hinterland, Castres; Lucien Pradayrol, Toulouse; Jacques Durand, and Gérard Normier, both of Castres, all of France, assignors to Pierre Fabre S.A., Paris, France

Filed Dec. 3, 1974, Ser. No. 529,147
Claims priority, application France, Dec. 3, 1973, 73.42891
Int. Cl.² A61K *35/48*
U.S. Cl. 424—105 **15 Claims**

1. A process for obtaining a plasminogen activator, wherein an acetone extract powder of the ovaries of sow obtained by grinding of the ovaries, dispersing the ground ovaries in acetone at a temperature below −10° C, filtering the suspension, drying the filter cake obtained, is treated by:

a. suspending said powder in an aqueous saline solution having an ionic strength between 0.1 and 0.01 and a pH in the range from 5 to 8;

b. taking up the precipitate obtained in stage (a) in an aqueous saline solution with an ionic strength of 0.6 to 1 at a pH value in the range of from 3 to 5;

c. precipitating the solution obtained in stage (b) after decantation, by adding a salt or acetone at a pH-value in the range from 3 to 5;

d. taking up the precipitate obtained in stage (c) in water or a saline solution, followed by precipitation by adding a salt at a pH-value of or slightly above 7;

e. optionally purifying the plasminogen activator of the precipitate obtained.

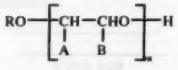
15. A process for treatment of arterial and venous thrombosis which comprise administration of the plasminogen activator obtained according to claim 1.

3,998,948
SURFACE ACTIVE AGENT CONTAINING HYDROXYLATED ALKYLSULFINYL CHAINS AND COMPOSITION CONTAINING SURFACE ACTIVE AGENT HAVING HYDROXYLATED ALKYLTHIO AND/OR HYDROXYLATED ALKYLSULFINYL CHAINS

Guy Vanlerberghe, Montjay-la-Tour, and Henri Sebag, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 288,327, Sept. 12, 1972, Pat. No. 3,906,048, which is a continuation-in-part of Ser. No. 874,373, Nov. 5, 1969, abandoned. This application June 6, 1975, Ser. No. 584,500
Claims priority, application Luxembourg, Nov. 5, 1968, 57246
Int. Cl.² A01N *9/04, 17/10*
U.S. Cl. 424—170 **9 Claims**

1. A composition utilizable in pharmacy, cosmetics or as a cleansing agent comprising in an aqueous or non-aqueous carrier at least one compound of the formula



wherein R represents a member selected from the group consisting of alkyl containing 8–30 carbon atoms, alkenyl containing 8–18 carbon atoms, nonyl phenyl, alkyl polyoxyalkylene containing 14–60 carbon atoms and 1–10 oxygen atoms and cycloaliphatic which is the residue of alcohols derived from the hydrogenation of lanolin, one of A and B represents hydrogen and the other a member selected from the group consisting of $-CH_2Z$, halomethyl and hydroxy with the proviso that at least 80% thereof be $-CH_2Z$ wherein Z is selected from the group consisting of R'S- and

wherein R' is selected from the group consisting of alkyl, monohydroxyalkyl and polyhydroxyalkyl, containing 1–4 carbon atoms, and *n* ranges between 1 and about 20, said compound being present in an amount of 0.1 to 25 percent by weight based on the total weight of said composition.

3,998,949
MALE CONTRACEPTIVE

Roy L. Whistler, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Continuation-in-part of Ser. No. 454,258, March 25, 1974. This application Mar. 13, 1975, Ser. No. 557,967
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 **10 Claims**

1. A method for inhibiting development of sperm cells which comprises orally or parenterally administering to a male mammalian recipient capable of producing sperm at least an effective amount of 5-Thio-D-glucose over a period of time during which such inhibition is required.

3,998,950
7-αHYDRAZINOACETAMIDO DERIVATIVES OF CEPHALOSPORANIC ACID

Renato Broggi, Milan; Giuseppe Libassi, Gruppello-Gavirate (Varese), and Giorgio Pifferi, Milan, all of Italy, assignors to ISF S.p.A., Milan, Italy

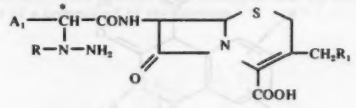
Filed Mar. 28, 1975, Ser. No. 563,135

Claims priority, application Italy, Apr. 2, 1974, 49985/74

Int. Cl.² A61K *31/545;* **C07D** *501/22, 501/32, 501/34, 501/42*

U.S. Cl. 424—246 **19 Claims**

1. Hydrazinocephalosporins of the formula:



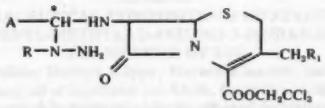
whercin the carbon atom marked with the asterisk represents an asymmetry center of the molecule,

A_1 represents a phenyl group which may be substituted by alkyl having 1–4 carbon atoms, halogen, hydroxy or alkoxy having 1–4 carbon atoms or a 2- or 3-thiophene group, which may be substituted by halogen,

R represents a hydrogen atom or a straight or branched chain lower alkyl radical containing from 1 to 5 carbon atoms,

R_1 represents a hydrogen atom, a hydroxy, acetoxy or pyridinium group; separated epimers thereof or the corresponding pharmaceutically acceptable salts thereof.

15. Trichloroethylesters of hydrazinocephalosporanic acid of the formula:



wherein the carbon atom marked with the asterisk represents an asymmetry center of the molecule,

A represents a phenyl group which may be substituted by alkyl having 1–4 carbon atoms, halogen, hydroxy or alkoxy having 1–4 carbon atoms or a 2- or 3-thiophene group, which may be substituted by halogen,

R represents a hydrogen atom or a straight or branched chain lower alkyl radical,

R_1 represents a hydrogen atom, a hydroxy, acetoxy or pyridinium group or; separated epimers thereof.

19. A pharmaceutical composition comprising an anti-bacterially effective amount of a compound as defined in claim 1 and a pharmaceutically acceptable carrier.

3,998,951
SUBSTITUTED 2-ARYLQUINAZOLINES AS FUNGICIDES

Wayne Nelson Harnish, Medina, and Arthur Albert Ramsey, Middleport, both of N.Y., assignors to FMC Corporation, Philadelphia, Pa.

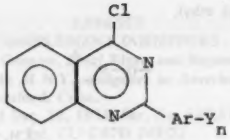
Filed Mar. 13, 1974, Ser. No. 450,870

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² A01N *9/22*

U.S. Cl. 424—251 **13 Claims**

1. A fungicidal composition which comprises, as active ingredient, a fungicidally effective amount of a quinazoline of the formula:



wherein Ar is phenyl or thienyl; Y is halogen or alkyl of 1 to 4 carbons; and *n* is 0 or 1; with the proviso that when Ar is phenyl and Y is chlorine, Y is in the 3- or 4-position of the phenyl ring; in admixture with an agriculturally acceptable carrier, and a surface-active agent.

3,998,952
2-(THI)OXO-3-IMIDAZOLYL-(2)-TETRAHYDROIMIDAZOLES

Atso Ilvespaa, Neuallschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

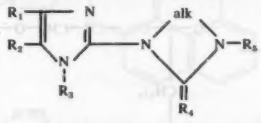
Filed Oct. 2, 1973, Ser. No. 402,668

Claims priority, application Switzerland, Oct. 4, 1972, 14481/72

Int. Cl.² C07D *403/14*

U.S. Cl. 424—251 **5 Claims**

1. An imidazole compound of the formula



wherein one of the radicals R_1 and R_2 denotes hydrogen or lower alkyl and the other denotes a nitro group, R_3 is lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, R_4 is oxo, R_5 is pyrimidinyl-(2), and "alk" is ethylene, and the N-oxides and a therapeutically acceptable acid addition salt thereof.

3,998,953
1,3,7-TRISUBSTITUED XANTHINE PERIPHERAL VASODILATORS

Wilhelm Konz, and Richard Reichl, both of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

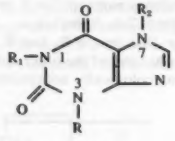
Filed Dec. 17, 1975, Ser. No. 641,550

Claims priority, application Germany, Dec. 21, 1974, 2460929

Int. Cl.² A61K *31/52;* **C07D** *57/48*

U.S. Cl. 424—253 **4 Claims**

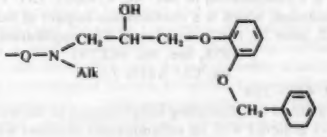
1. A compound of the formula



wherein

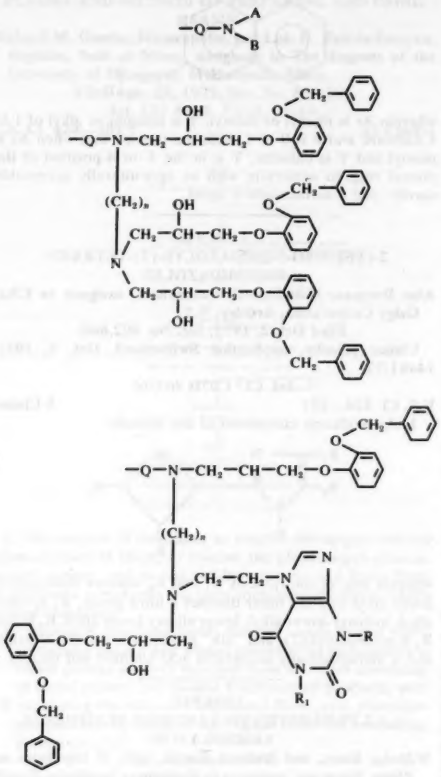
R is methyl or ethyl,

R_1 is methyl, ethyl or



and

R_2 is methyl, ethyl,



where

Alk is alkyl of 1 to 4 carbon atoms,

Q is ethyl, propyl, isopropyl or 2-hydroxy-propyl,

A is 3-phenoxy-2-hydroxy-propyl, where the phenyl ring is substituted in the o-position by hydroxy, methoxy, n-hexyloxy or benzyloxy,

B is alkyl of 1 to 4 carbon atoms, phenyl, p-methylphenyl, 3-phenyl-3-hydroxy-isopropyl or A, as defined above, and

n is an integer from 2 to 6, inclusive,

provided, however, that one of R_1 and R_2 must be methyl or ethyl and the other has one of the other indicated meanings; or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3,998,954

1,3(2H,4H)-DIOXOISOQUINOLINE-4-CARBOXAMIDES USED AS ANTI-INFLAMMATORY AGENTS

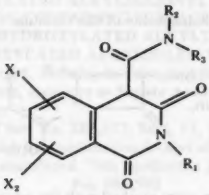
Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 113,082, Feb. 5, 1971, Pat. No. 3,886,163, which is a continuation of Ser. No. 674,664, Oct. 11, 1967, abandoned, which is a continuation-in-part of Ser. No. 649,462, June 28, 1967, abandoned. This application Mar. 27, 1975, Ser. No. 562,797

Int. Cl.[2] A61K *31/47*

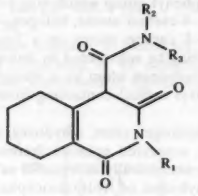
U.S. Cl. 424—258 **8 Claims**

1. A method for alleviating inflammation in the treatment of a subject afflicted with an inflammatory disorder which comprises administering to said subject an effective amount of a compound of the formula



I

or



II

wherein:

R_1 is selected from the group consisting of hydrogen; alkyl having from 1 to 6 carbon atoms; alkyl phenyl with up to one substituent selected from the group consisting of fluorine, chlorine, bromine, methoxy, ethoxy and alkyl having up to 3 carbon atoms; and benzyl with up to 1 nuclear substituent selected from the group consisting of fluorine, chlorine, bromine, methoxy, ethoxy and alkyl having up to 3 carbon atoms;

R_2 is selected from the group consisting of hydrogen; primary alkyl having from 1 to 6 carbon atoms;

R_3 is selected from the group consisting of hydrogen; alkyl having from 1 to 6 carbon atoms, allyl; cycloalkyl having from 3 to 6 carbon atoms; polyfluoroalkyl having up to 3 carbon atoms; phenyl having up to 2 substituents each identically selected from the group consisting of fluorine, chlorine, bromine, methoxy, ethoxy, alkyl having up to 3 carbon atoms, acetyl and trifluoromethyl, or having 2 substituents each separately selected from the group consisting of chlorine, methyl, methoxy and trifluoromethyl; naphthyl and phenylalkyl having up to 2 carbon atoms in the alkyl moiety with up to 1 nuclear substituent selected from the group consisting of fluorine, chlorine, bromine, methoxy, ethoxy and alkyl having up to 3 carbon atoms; and

R_2 and R_3, taken together, form a heterocycle selected from the group consisting of pyrrolidine, piperidine, hexamethyleneimine and morpholine;

provided that R_2 always is hydrogen when R_3 is tertiary alkyl; and

X_1 and X_2 are at the 6 and 7 positions respectively are each identically selected from the group consisting of hydrogen, fluorine, chlorine, bromine, methoxy, ethoxy and alkyl having up to 3 carbon atoms and trifluoromethyl or either X_1 or X_2 is H and the other is as defined above.

3,998,955

ANTIHYPERTENSIVE COMPOSITIONS

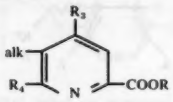
Hans Kuhnis, Basel; Christian Egli, Magden; Kurt Eichenberger, Therwil, and Phyllis Roberta Hedwall, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 331,147, Feb. 9, 1973, Pat. No. 3,914,239. This application Apr. 16, 1975, Ser. No. 568,483

Int. Cl.² A61K *31/455*

U.S. Cl. 424—266 7 Claims

1. A pharmaceutical preparation useful in the treatment of hypertension, which comprises an antihypertensively effective amount of a compound of the formula



in which R represents hydrogen or lower alkyl, alk represents an alkyl group having 4 to 5 carbon atoms, R_3 and R_4 each represents chloro or lower alkoxy and one of the symbols R_3 and R_4 may also represent hydrogen or a therapeutically usable salt thereof, together with a therapeutically usable excipient.

3,998,956

PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(THIENYL-METHYL)-2-ANILINO-2-IMIDAZOLINE AND METHOD OF USE

Helmut Stähle; Herbert Köppe; Werner Kummer, and Klaus Stockhaus, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

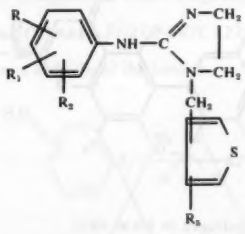
Division of Ser. No. 441,451, Feb. 11, 1974, Pat. No. 3,939,717. This application Dec. 10, 1975, Ser. No. 639,341

Claims priority, application Germany, Feb. 23, 1973, 2308883

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 10 Claims

1. An analgesic or hypotensive pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective analgesic or hypotensive amount of a compound of the formula



wherein

R, R_1 and R_2 are each hydrogen, fluorine, chlorine, bromine, methyl, ethyl, methoxy, trifluoromethyl or cyano, and

R_5 is hydrogen, methyl or ethyl, or a non-toxic, pharmaceutically acceptable acid addition salt thereof.

3,998,957

COMPLEMENT INHIBITORS

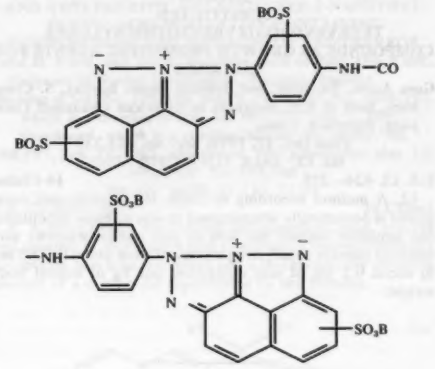
Ransom Brown Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,370

Int. Cl.² C07D *249/22*

U.S. Cl. 424—273 7 Claims

1. A compound selected from those of the formula:



wherein B is Na or K, with the proviso that each B is identical to the same compound.

3,998,958

PYRROLIDYLIDENE, PIPERIDYLIDENE AND HEXAHYDROAZEPINYLIDENE UREAS AS CNS DEPRESSANTS

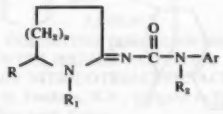
Chris Royce Rasmussen, Ambler; Joseph Francis Gardocki, Doylestown, and James Nelson Plampin, Roslyn, all of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 499,706, Aug. 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 335,845, Feb. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 235,816, March 17, 1972, abandoned. This application July 16, 1975, Ser. No. 600,745

Int. Cl.² A61K *31/33, 31/40, 31/445*

U.S. Cl. 424—274 7 Claims

1. A process of alleviating anxiety which comprises systemically administering to an anxious individual a pharmaceutical composition in dosage unit form comprising per dosage from about 15 to about 350 mg of a member selected from the group consisting of a compound of the formula:



wherein *n* is the integer 1, 2 or 3, R is a member selected from the group consisting of hydrogen and loweralkyl, R_1 is a member selected from the group consisting of loweralkyl and benzyl, R_2 is a member selected from the group consisting of hydrogen and loweralkyl, and Ar is a member selected from the group consisting of phenyl, halophenyl, loweralkylphenyl, loweralkoxyphenyl, trifluoromethylphenyl, nitrophenyl, cyanophenyl, methylithiophenyl, loweralkylcarbonyl-phenyl and benzyloxyphenyl, provided that when said *n* is 2 or 3, then

said R is hydrogen and said R_1 is loweralkyl, and the therapeutically active acid addition salts thereof in admixture with a pharmaceutical carrier.

3,998,959

SUBSTITUTED TETRAHYDRO-OXYBENZOTHIENYLUREA COMPOUNDS AS GROWTH PROMOTING AGENTS FOR ANIMALS

Goro Asato, Titusville, and Terence James Bentley, S. Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 17, 1975, Ser. No. 623,233
Int. Cl.² A61K *31/38*; C07D *333/24*
U.S. Cl. 424—275 14 Claims

12. A method according to claim 10, wherein said compound is parenterally administered as one or more subcutaneous implants beneath the skin of said animal whereby said implants provide a daily drug release of from about 0.0005 mg to about 0.2 mg of said compound per kg of animal body weight.

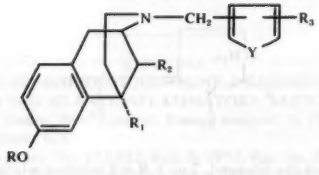
3,998,960

PHARMACEUTICAL COMPOSITIONS CONTAINING A 2-(HETEROARYL-METHYL)-5,9β-DIALKYL-6,7-BENZOMORPHAN AND METHOD OF USE

Herbert Merz; Adolf Langbein; Klaus Stockhaus, and Helmut Wick, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Division of Ser. No. 367,114, June 5, 1973, Pat. No. 3,931,194. This application Oct. 30, 1975, Ser. No. 627,207
Claims priority, application Germany, June 19, 1972, 2229695
Int. Cl.² A61K *31/38*, *31/34*
U.S. Cl. 424—275 12 Claims

1. An analgesic, antitussive or opiate-antagonistic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective analgesic, antitussive or opiate-antagonistic amount of a compound of the formula



wherein

R is hydrogen, methyl or acetyl,

R_1 and R_2 are each alkyl of 1 to 3 carbon atoms,

R_3 is hydrogen or methyl, and

Y is oxygen or sulfur,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

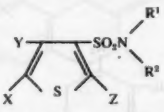
3,998,961

FUNGICIDAL SULFONAMIDOTHIOPHENES

Laroy H. Edwards, Napa, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 489,310, June 29, 1974, Pat. No. 3,888,879. This application May 19, 1975, Ser. No. 578,559
The portion of the term of this patent subsequent to June 10, 1992, has been disclaimed.
Int. Cl.² A01N *9/16*
U.S. Cl. 424—275 15 Claims

1. A fungicidal composition comprising a fungicidally effective amount of a compound of the formula



wherein X is nitro, fluoro, chloro or bromo; Y is hydrogen, nitro, fluoro, chloro or bromo; Z is nitro, fluoro, chloro or bromo; R^1 is alkyl of 1 to 6 carbon atoms, phenyl or phenyl substituted with up to 2 of the same or different substituents selected from the group consisting of trifluoromethyl, trichloromethyl, fluoro, chloro, bromo, iodo, nitro and alkyl of 1 to 3 carbon atoms; and R^2 is haloalkylthio of 1 to 2 carbon atoms and 2 to 5 of the same or different halogens selected from the group consisting of fluoro, chloro and bromo; and a biologically inert carrier.

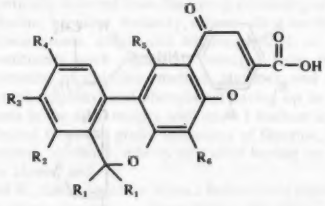
3,998,962

PHARMACEUTICAL COMPOSITIONS CONTAINING A 2-CARBOXY-4-OXO-4H,10H-(2)-BENZOPYRANO-[4,3-G]-(1) BENZOPYRAN OR A SALT THEREOF AND METHOD OF USE

John Devlin, Pierrefonds; Patrick Brian Stewart, St. Andrews East, and Kurt Freter, Beaconsfield, all of Canada, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 392,182, Aug. 28, 1973, Pat. No. 3,901,925. This application June 16, 1975, Ser. No. 587,331
Claims priority, application Austria, Aug. 29, 1972, 7425/72
Int. Cl.² A61K *31/35*
U.S. Cl. 424—283 10 Claims

1. A pharmaceutical dosage unit composition for suppressing reagin-mediated allergic reactions, said composition consisting essentially of an inert pharmaceutical carrier and an effective antiallergic amount of a compound of the formula



wherein R_1 is hydrogen or lower alkyl,

R_2, R_4 and R_5 are each hydrogen, lower alkyl, hydroxyl, lower alkoxy, lower alkanoyloxy, nitro or $-SO_3H$, and

R_3 and R_6 are each hydrogen, lower alkyl, hydroxyl, lower alkoxy, lower alkanoyloxy, halogen, nitro, $-SO_3H$, hydroxycarbonyl-methoxy, β-hydroxy-ethoxy or β-aminoethoxy,

or a salt thereof.

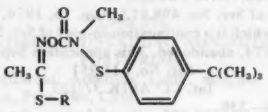
3,998,963

TERTIARY BUTYL SUBSTITUTED CARBAMOYL OXIME PESTICIDES

John A. Durden, Jr., South Charleston, and Anthony A. Sousa, Saint Albans, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,443
Int. Cl.² A01N 9/00, 9/12
U.S. Cl. 424—298 8 Claims

1. An insecticide and miticide composition comprising an insecticidally and miticidally effective amount of a compound of the formula:



wherein R is methyl, ethyl or isopropyl and an acceptable carrier compound.

3,998,964

α-AMINO-β-(N-BENZYLTHIOCARBAMOYLTHIO) PROPIONIC ACID AND THERAPEUTIC COMPOSITIONS

Rolf Madaus, Cologne-Bruck, and Gerhard Brüsewitz, Bensberg, both of Germany, assignors to Dr. Madaus & Co., Cologne, Germany

Continuation of Ser. No. 173,673, Aug. 20, 1971, abandoned. This application Feb. 4, 1974, Ser. No. 438,975
Claims priority, application Germany, Aug. 22, 1970, 2041831
Int. Cl.² A61K 31/27; C07C 155/08
U.S. Cl. 424—300 15 Claims

1. α-Amino-β-[(N-benzylthiocarbamoyl)-thio] propionic acid.

9. Therapeutic composition for the oral treatment of bacterial and mycotic disorders comprising a pharmaceutically acceptable carrier and as an active ingredient α-amino-β-[(N-benzylthiocarbamoyl)-thio] propionic acid as claimed in claim 1, in therapeutically effective amounts.

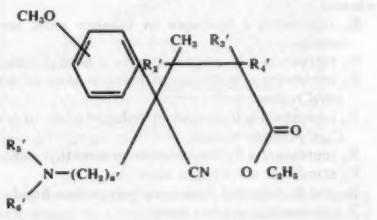
3,998,965

4-AMINOALKYL-4-CYANO-4-PHENYL-BUTANOIC ACID ESTERS

Maurice Ward Gittos, Slough, and David Anthony Amey, Luton, both of England, assignors to Aspro-Nicholas Limited, England

Continuation-in-part of Ser. No. 425,876, Dec. 18, 1973, Pat. No. 3,963,729. This application Dec. 11, 1974, Ser. No. 531,556
Claims priority, application United Kingdom, Dec. 15, 1973, 58202/73
Int. Cl.² A61K 31/275; C07C 121/78
U.S. Cl. 424—304 4 Claims

1. Alkyl esters and salts of the formula



wherein
n′ represents 2 or 3;
R_2', R_3', and R_4', independently represent hydrogen or methyl, and
R_5', and R_6' independently represent methyl or ethyl.

4. A pharmaceutical composition in a dosae unit form containing 1 to 1000 mg of a compound of claim 1 per dosage unit, and a pharmaceutically acceptable carrier.

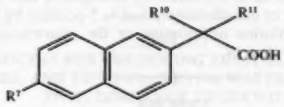
3,998,966

ANTI-INFLAMMATORY, ANALGESIC, ANTI-PYRETIC AND ANTI-PRURITIC 6-SUBSTITUTED 2-NAPHTHYL ACETIC ACID DERIVATIVE-CONTAINING COMPOSITIONS AND METHODS OF USE THEREOF

John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Panama, Panama

Division of Ser. No. 195,878, Nov. 4, 1971, Pat. No. 3,896,157, which is a division of Ser. No. 694,771, Dec. 7, 1967, abandoned, which is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned. This application Mar. 17, 1975, Ser. No. 558,988
Int. Cl.² A61K 31/235, 31/19
U.S. Cl. 424—308 25 Claims

1. A composition for treating inflammation, pain, pyrexia and pruritus in mammals which comprises a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of a compound represented by the formula:



XIV

where:
R^7 is alkyl having 1 to 6 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, hydroxymethyl, alkoxymethyl having 2 to 7 carbon atoms, trifluoromethyl, vinyl, ethynyl, fluoro, chloro, hydroxy or a conventional hydrolyzable ester thereof derived from a hydrocarbon carboxylic acid having 1 to 12 carbon atoms, alkoxy having 1 to 6 carbon atoms, difluoromethoxy, alkoxymethyloxy, having 2 to 7 carbon atoms, alkylthiomethyloxy having 2 to 7 carbon atoms, alkylthio having 1 to 6 carbon atoms, difluoromethylthio, alkoxymethylthio having 2 to 7 carbon atoms, alkylthiomethylthio having 2 to 7 carbon atoms, formyl, carboxy, alkoxycarbonyl having 2 to 7 carbon atoms, acetyl, cyano or phenyl optionally p-monosubstituted with methyl, fluoro, chloro, hydroxy, methoxy or ethyl;
one of R^{10} and R^{11} is hydrogen, and the other is methyl, ethyl, difluoromethyl, fluoro or chloro, or R^{10} and R^{11} taken together are alkylidene, halomethylene or ethylene;
an alkyl ester of a compound of formula XIV derived from an alkanol having 1 to 12 carbon atoms; or a pharmaceutically acceptable addition salt thereof.

3,998,967

METHOD OF INHIBITING THE GROWTH OF BACTERIA AND FUNGI WITH HIGHER ALIPHATIC AMINE SALTS OF NITRILOTRIACETIC ACID

Edward D. Weil, Yonkers, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 423,965, Dec. 12, 1973, abandoned, which is a continuation of Ser. No. 202,001, Nov. 24, 1971, abandoned, which is a division of Ser. No. 830,873, June 5, 1969, abandoned. This application July 14, 1975, Ser. No. 595,826
Int. Cl.² A01N 9/20
U.S. Cl. 424—316 4 Claims

1. A method of inhibiting the growth of bacteria and fungi which comprises; exposing the bacteria and fungi to an effective amount for inhibiting the growth of bacteria and fungi of

a salt of nitrilotriacetic acid with an aliphatic amine containing from about 8 to about 60 carbon atoms, said amine consisting essentially of radicals selected from the group consisting of alkyl, alkenyl and cycloalkyl, wherein the cyclic portion of said cycloalkyl contains 6 carbon atoms.

3,998,968

BENZENESULFONYL UREAS AND PROCESS FOR THEIR MANUFACTURE

Volker Hitzel, Lorsbach, Taunus; Werner Pfaff, Hofheim, Taunus; Rudi Weyer, Kelkheim, Taunus, and Helmut Weber, Schneidhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

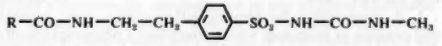
Filed Mar. 19, 1975, Ser. No. 559,712

Claims priority, application Germany, Mar. 21, 1974, 2413514

Int. Cl.² C07C *127/00*

U.S. Cl. 424—321 **9 Claims**

1. A benzenesulfonyl urea of the formula



in which R stands for alkyl of 1 to 4 carbon atoms or phenyl which is substituted in 2-position by alkoxy of 1 to 4 carbon atoms, phenoxy or dimethylamino and in 5-position by hydrogen, methyl, chlorine or bromine or the pharmaceutically acceptable salts thereof.

3,998,969

FORMAMIDINE INSECTICIDES

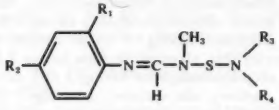
Victor L. Rizzo, Almena Township, Van Buren County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed May 7, 1975, Ser. No. 575,247

Int. Cl.² A01N *9/20*

U.S. Cl. 424—324 **21 Claims**

1. A compound of the formula:



wherein R_1 is lower alkyl of from 1 to 4 carbon atoms; R_2 is hydrogen, halogen or lower alkyl of from 1 to 4 carbon atoms; R_3 and R_4 are the same or different and are hydrogen, alkyl of 1 to 8 carbon atoms; haloalkyl, phenylalkyl and

wherein alkyl is from 1 to 4 carbon atoms, cycloalkyl of from 3 to 6 carbon atoms, or phenyl.

3,998,970

N,N-DIMETHYL-N'-PHENYLTHIOCARBAMYL FORMAMIDINE AND ITS USE AS AN ANTI-INFLAMMATORY AGENT

Jack R. DeBaun, Sunnyvale; Ferenc M. Pallos, Walnut Creek, and Eugene G. Teach, El Cerrito, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 572,242, April 28, 1975, Pat. No. 3,959,368. This application Jan. 12, 1976, Ser. No. 648,601

Int. Cl.² A61K *31/155*

U.S. Cl. 424—326 **1 Claim**

1. A method of treatment of an inflammatory condition in a mammal comprising administering to said mammal an anti-inflammatory effective amount of N,N-dimethyl-N'-phenylthiocarbamyl formamidine.

3,998,971

NOVEL N-VINYLOXYETHYL-α-METHYL-β-PHENETHYLAMINES FOR DEPRESSING APPETITE

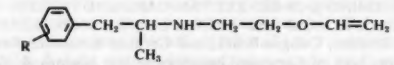
Bruce Wayne Horrom, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 498,013, Aug. 16, 1974, Pat. No. 3,925,475, which is a continuation-in-part of Ser. No. 481,626, June 21, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,951

Int. Cl.² A61K *31/135*

U.S. Cl. 424—330 **3 Claims**

1. A method of depressing appetite in a mammal comprising administering to said mammal a therapeutically effective amount of a compound of the formula:



wherein R is hydrogen, halo or trifluoromethyl and acid addition salts thereof.

3,998,972

DIPHENYL DERIVATIVES

Saleem Farooq, Aesch, and Friedrich Karrer, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

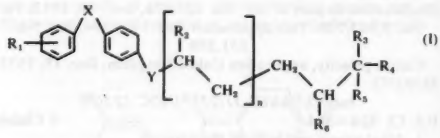
Filed Oct. 3, 1975, Ser. No. 619,416

Claims priority, application Switzerland, Sept. 3, 1975, 11408/75

Int. Cl.² C07C *149/32;* **A01N** *9/00*

U.S. Cl. 424—337 **11 Claims**

10. A insect or acarid control composition containing as active constituent a insecticidally or acaridicidally effective amount of a compound according to claim 1 of the formula I:



(I)

wherein

R_1 represents a hydrogen or halogen atom or a methyl radical,

R_2 represents a hydrogen atom or a methyl radical,

R_3 represents a hydrogen or halogen atom or a methyl or ethyl radical, and

R_4 represents a hydrogen or halogen atom or a methyl or C_1–C_4-alkoxy radical,

R_5 represents a hydrogen atom or a methyl radical, while

R_6 stands for a hydrogen atom, or

R_5 and R_6 together form a carbon-carbon bond,

X represents a sulphur atom,

Y represents an oxygen atom, and

n represents O or the number 1;

together with a suitable carrier therefor.

3,998,973

THICKENING COMPOSITION

Bernard C. Carlson, Weston, Conn., assignor to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Filed Apr. 7, 1975, Ser. No. 565,820
Int. Cl.² A61K 7/48
U.S. Cl. 424—357 9 Claims

1. A thickening composition which comprises a synergistic misture of swellable colloidal magnesium aluminum silicate, a polyoxyethylene C_{12-22} alkyl ether or ester having 20-50 oxyethylene units per molecule, and sodium carboxymethylcellulose in the ratio of about 80:10:10 to 98:1:1 by weight, respectively.

3,998,974

COMESTIBLES CONTAINING NON-NUTRITIVE FLAVORING

Alejandro Zaffaroni, Atherton, Calif., assignor to Dynapol Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 300,857, Oct. 25, 1972, abandoned. This application June 6, 1975, Ser. No. 584,550
Int. Cl.² A23L 1/226
U.S. Cl. 426—534 3 Claims

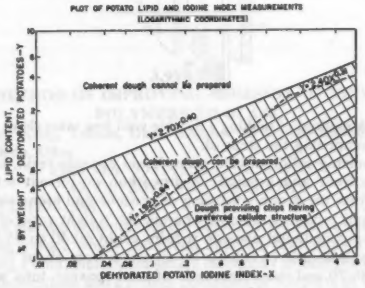
2. A comestible composition of matter comprising an essentially nonabsorbable, nonnutritive, water soluble flavor imparting compound of the general formula (F—$Z\frac{}{n}$—C wherein F is a biologically active flavor imparting agent, Z is a covalent bond that permanently bonds the flavor imparting agent to C and is essentially unaltered under the conditions of passage through the gastrointestinal tract, *n* is at least one, and C is a polymeric controller molecule other than F that is substantially indigestible and non-absorbable and has a molecular weight in excess of 400 and a three dimensional space occupying group of molecular dimensions that prevent (F—$Z\frac{}{n}$—C absorption through the mucosa of the gastrointestinal tract as the flavor imparting compound passes through the gastrointestinal tract, and wherein the flavor imparting compound is admixed with an edible comestible substance.

3,998,975

POTATO CHIP PRODUCTS AND PROCESS FOR MAKING SAME

Alexander L. Liepa, Montgomery, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 62,175, Aug. 7, 1970, abandoned, which is a continuation of Ser. No. 724,662, March 18, 1968, abandoned, which is a continuation-in-part of Ser. No. 581,925, Sept. 26, 1966, abandoned. This application Aug. 2, 1974, Ser. No. 493,821
Int. Cl.² A23L 1/10
U.S. Cl. 426—550 11 Claims


PLOT OF POTATO LIPID AND IODINE INDEX MEASUREMENTS
(LOGARITHMIC COORDINATES)
LIPID CONTENT, % BY WEIGHT OF DEHYDRATED POTATOES—Y
DEHYDRATED POTATO IODINE INDEX—X
Coherent dough cannot be prepared
Coherent dough can be prepared
Dough providing chips having preferred cellular structure

1. A process for preparing a potato chip of tender eating quality characterized by a multiplicity of individual expanded air cells, said chip being made from a dough comprising dehydrated cooked potatoes and water, said process comprising the steps of: adjusting the iodine index and adjusting the lipid content of said dehydrated potatoes to provide a lipid content and an iodine index which are defined by points within the cross-hatched area of FIG. 1, intimately admixing water with said dehydrated cooked potatoes to form a coherent workable dough comprising from 25% to 55% water by weight, said dough being free of non-potato binder materials, forming said dough into chip-like pieces, and frying said pieces until they are crisp.

3,998,976

LOW-CALORIE CONFECTION

Roger Pernod, St. Denis en Val, France, and Willy Rufer, Geneva, Switzerland, assignors to Battelle Memorial Institute, Carouge, Switzerland

Filed Dec. 5, 1975, Ser. No. 638,072
Claims priority, application Germany, Dec. 9, 1974, 2458650
Int. Cl.² A23G 3/00
U.S. Cl. 426—103 9 Claims

1. A low-calorie confection, comprising the combination of at least one layer of marshmallow and at least one layer of a homogeneous paste containing 20 to 30 percent by weight of purified edible alpha cellulose powder, 3 to 5 percent by weight of proteins, 3 to 10 percent by weight of lipids, 45 to 60 percent by weight of sugars and 10 to 15 percent by weight of water, the califoric value of this paste being at most 300 calories per 100 grams.

3,998,977

PROCESS FOR PRODUCING FRUIT FLAKES OR WAFERS, AND FRUIT FLAKES OR WAFERS PRODUCED IN ACCORDANCE THEREWITH

Hans H. Rabeler, 23 Jordan St., 8190 Wolfratshausen, Germany

Continuation of Ser. No. 432,711, Jan. 11, 1974, abandoned. This application Jan. 20, 1976, Ser. No. 650,746
Claims priority, application Germany, Jan. 18, 1973, 2302242
Int. Cl.² A23B 7/02, 7/08
U.S. Cl. 426—144 18 Claims

1. A process for the production of fruit flakes comprising applying a moist mass consisting essentially of fruit pulp, sugar added to said pulp and starchy material added to said pulp, to a hot smooth rotating cylindrical substrate in a thin layer, said fruit pulp being about 80 to 85 percent by weight of said moist mass, said added sugar being about 5 to 10 percent by weight of said moist mass and said added starchy material being about 5 to 10 percent by weight of said moist mass, maintaining the substrate at a temperature sufficient to cause caramelization of said moist mass, at least partially dehydrating said layer to form a cohesive film, peeling said film from said substrate and forming said film into an irregular structure, drying said film until it is brittle, and dividing said film into flakes.

3,998,978

CORRUGATED CEREAL FLAKES

Norman F. Lawrence, and Stanley H. Reesman, both of Battle Creek, Mich., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 28, 1975, Ser. No. 581,466
Int. Cl.² A23L 1/10
U.S. Cl. 426—285 6 Claims

1. Process of producing a multi-textured flaked cereal which comprises partially cooking a first cereal charge from which rice is absent, then adding to the first charge a charge of rice at a level of 5 – 45% by weight of the total raw grain charge, further cooking the combined charges until the grains thereof are substantially gelatinized but heterogeneously aggregated and substantially adhere to one another, thereafter cooling, partially drying and corrugating the aggregate in the form of a thin flake comprising ribs and thinner intermediate connected membranes, and toasting the corrugated flake.

6. Product of the process of claim 1.

3,998,979

PHOTOCURABLE PIGMENTED COATING COMPOSITIONS

Colin Armstrong, West Kingsdown; Peter Francis Nicks, Maidenhead, and Derek John Walbridge, Beaconsfield, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 403,565, Oct. 4, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,763

Claims priority, application United Kingdom, Oct. 9, 1972, 46408/72

Int. Cl.² C08G *18/00, 63/00*

U.S. Cl. 427—54 **4 Claims**

1. A pigmented coating composition suitable for use in visible light which comprises an unsaturated oil-modified alkyd resin polymer capable of autoxidative polymerisation in the presence of oxygen and 0.05 – 5% by weight based on the combined weight of pigment and polymer of a photosensitiser selected from the group consisting of benzil, anisil, o-tolil, 1-naphthil, 2-naphthil, furil and thenil.

3,998,980

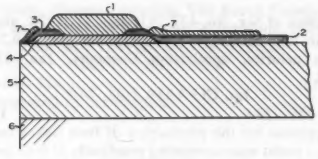
FABRICATION OF THICK FILM RESISTORS

Alan C. Antes, Colorado Springs; James R. Drehle, Fort Collins, and Blair H. Harrison, Colorado Springs, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 250,771, May 5, 1972, abandoned. This application May 30, 1974, Ser. No. 474,827

Int. Cl.² H01C *17/06;* **B05D** *5/12*

U.S. Cl. 427—103 **9 Claims**



1. A process for fabricating a thick film resistor upon an element, said process comprising the steps of:

depositing a crystallizable dielectric layer upon the element;

firing the crystallizable dielectric layer at an elevated temperature;

depositing a layer of cermet resistive material upon the crystallizable dielectric layer; and

firing the cermet resistive material at an elevated temperature in a neutral atmosphere.

3,998,981

METHOD FOR PRODUCING A TIRE-MOUNTED ANTI-SKID DEVICE

Lieselotte Burkhardt, Bremerhaven; Wilhelm Schuster, Frankfurt am Main, and Walter Stuck, Bremen-Beckedorf, all of Germany, assignors to Wolkro Aktiengesellschaft, Zug, Switzerland

Filed Aug. 8, 1975, Ser. No. 603,023

Claims priority, application Germany, Aug. 14, 1974, 2438925

Int. Cl.² B05C *3/107;* **B60C** *11/00;* **C09J** *5/04*

U.S. Cl. 427—171 **6 Claims**

1. A method for the production of an endless anti-skid device for mounting on vehicle tires of a predetermined diameter, comprising the steps of

1. spreading an endless mesh structure of synthetic fibers defining a multiplicity of interstices, the diameter of the endless mesh structure being less than the predetermined diameter of the vehicle tires, to the diameter of the vehicle tires,

2. completely immersing the spread endless mesh structure in an impregnation bath of a hot-vulcanizable elastomer dissolved in a solvent until all the interstices of the mesh structure are filled,

3. removing the impregnated endless mesh structure from the impregnation bath,

4. storing the impregnated spread endless mesh structure in the air until at least 80% of the solvent has evaporated,

5. repeating steps (2), (3) and (4) a number of times until a desired thickness of elastomer has been deposited on the spread mesh structure, and

6. placing the spread and impregnated endless mesh structure in an autoclave and treating it with hot steam to cure the elastomer by vulcanization and fix the fibers in position in the cured elastomer.

3,998,982

METHOD OF CUTTING AND GRINDING POROUS PEN TIPS

Diosdado M. Mauleon, Los Angeles, and Henry Peper, Jr., Pacific Palisades, both of Calif., assignors to The Gillette Company, Boston, Mass.

Filed June 2, 1975, Ser. No. 582,599

Int. Cl.² B29C *17/10, 17/14*

U.S. Cl. 427—230 **2 Claims**

1. The method of forming a writing tip for a pen having plural, longitudinal capillary channels therein, comprising: filling plural, longitudinal capillary channels in an extruded plastic rod with a liquid which is compatible and miscible with ink subsequently to be used in the pen to increase resistance of said rod to radial crushing and then while said capillary channels are filled with said liquid both transversely cutting said rod into plural short pieces and grinding end surfaces of said pieces to shape them into writing tips.

3,998,983

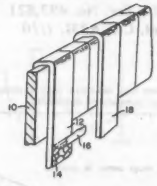
RESIN RICH EPOXIDE-MICA FLEXIBLE HIGH VOLTAGE INSULATION

James D. B. Smith, Turtle Creek, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 27, 1975, Ser. No. 591,244

Int. Cl.² B05D *3/02;* **B32B** *19/04, 27/38*

U.S. Cl. 427—374 R **8 Claims**



1. A method of making a flexible void free mica sheet material comprising the steps of:

a. mixing solid epoxide resin, liquid epoxide resin, ketone solvent and aromatic hydrocarbon co-solvent selected from the group consisting of benzene and arene solvents and mixtures thereof; wherein the weight ratio of solid epoxide:liquid epoxide is from about 60:40 to 95:5; the weight ratio of ketone: co-solvent is from about 70:30 to 30:70 and the weight ratio of total epoxide: total solvent is from about 85:15 to 30:70, and then

b. mixing the epoxide — solvent mixture, with an organotitanate catalyst selected from compounds having the structural formula $Ti(OR)_4$, wherein each R group is independently selected from the group consisting of alkyl

groups having 1 to 10 carbon atoms, aryl groups, Cl, Br or NO_2 substituted aryl groups, alkaryl groups with the alkyl constituent having from about 1–10 carbon atoms, Cl, Br or NO_2 substituted alkaryl groups with the alkyl constituent having from about 1–10 carbons, aralkyl groups with the alkyl constituent having about 1–10 carbon atoms, cyclopentane groups, cyclopentene groups, cyclopentadiene groups, cyclohexane groups, cyclohexene groups, and cyclohexadiene groups, to form a homogeneous admixture,

c. applying the homogeneous catalyzed epoxide-solvent admixture to a sheet material comprising mica, so that organo-titanate contacts mica causing organo-titanate to act as a latent catalyst,

d. removing solvent from the epoxide-solvent admixture in the sheet material to form a flexible B staged epoxide resin containing organo-titanate as a latent catalyst contacting mica in the sheet material; wherein the amount of organo-titanate added is effective to cure the epoxide in the sheet material upon heating.

3,998,984

SODIUM TETRABORATE CARRIER COATING FOR ROD

Walter Andrew Smigel, Homer, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 430,437, Jan. 3, 1974, Pat. No. 3,936,314. This application Nov. 14, 1975, Ser. No. 631,977

Int. Cl.² B05D *3/02*

U.S. Cl. 427—384 **6 Claims**

1. The process of coating wire rod with a carrier coating comprising immersing

the wire rod in an aqueous coating dispersion containing about 8 to about 32 ounces per gallon of water of the concentrate consisting essentially of from about 10 to about 30% by weight of one or more water insoluble metal soaps selected from the group consisting of calcium, barium, aluminum, magnesium and zinc soaps of fatty acids having from about 12 to about 18 carbon atoms, from about 65 to about 89% by weight of sodium tetraborate, and from about 1 to about 5% by weight of one or more organic dispersing agents,

removing the wire rod from the aqueous coating solution in a manner to allow the excess coating material to drain off of the rod, and

heating the coated wire rod at a temperature within the range of about 350° to 450° F., to evaporate water from the coating.

3,998,985

METHOD OF IMPROVING ADHESION OF VINYL POLYMERS TO GLASS

Walter Kitaj, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 3, 1975, Ser. No. 554,957

Int. Cl.² B05D *3/02;* **B32B** *17/10*

U.S. Cl. 427—386 **7 Claims**

1. A method of improving the adhesion of a vinyl plastisol to a glass surface which comprises applying thereto as a single coating a combination consisting essentially of said plastisol, a polyaminosilane and a primer consisting of 8.4 parts by weight of an epichlorohydrin-bisphenol A resin, 1.6 parts by weight of N-aminoethyl-gamma-aminopropyltrimethoxysilane and 45 parts by weight each of ethyleneglycolmonomethyl ether and ethyleneglycolmonoethylether acetate and thereafter curing said coating.

3,998,986

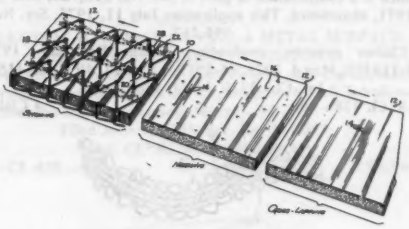
CONVEYOR BELT OF RUBBER REINFORCED WITH STITCH-BONDED WEB FABRIC

Leslie E. Williams, College Park, Ga., assignor to Uniroyal Inc., New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,235

Int. Cl.² B32B *3/06, 5/06, 7/08;* **F16G** *1/10*

U.S. Cl. 428—102 **5 Claims**



1. A conveyor belt comprising at least one layer of a reinforcing fabric which is a stitch-bonded web of staple fibers having a denier of from 1 to 22 and a length of from 1 to 10 inches, said web having a weight of from about 2 to about 24 ounces per square yard, said web being stitched with yarn of from 40 to 1200 denier at the rate of 6 to 24 stitches per inch in longitudinal rows spaced 5 to 20 per inch, the stitch yarns constituting 30 to 60% of the total weight of the fabric and amounting to 0.6 to 15 ounces per square yard, the total fabric weight of said stitch-bonded web of staple fibers being 3 to 24 ounces per square yard, said belt having a layer of elastomeric belt stock on each side constituting carrying and pulley sides of the belt, the said reinforcing fabric being embedded between the layers of elastomeric belt stock and being impregnated with an adhesive composition for adhering the reinforcing fabric within the belt.

3,998,987

ELECTROSTATIC RECORDING ELEMENT

Kiichi Kirigaya; Makoto Ogiwara; Syosaku Koseki, and Toshiho Yamaguchi, all of Shizuoka, Japan, assignors to Tomoegawa Paper Mfg. Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 305,275, Nov. 10, 1972. This application Jan. 23, 1975, Ser. No. 543,535

Claims priority, application Japan, May 20, 1971, 46-34251; Nov. 13, 1971, 46-90932

Int. Cl.² B44C *1/00;* **B44D** *1/10*

U.S. Cl. 428—330 **3 Claims**

1. An electrostatic recording element having a conductive layer and a surface layer electrostatically chargeable upon application of an electric field, said surface layer consisting of an upper recording layer and a lower insulating layer adjacent the conductive layer, said recording layer comprising an insulating hydrophobic resin and a non-photosensitive, inorganic pigment in a ratio of from about 100 to about 1000 parts by weight per 100 parts by weight of said resin, and said lower insulating layer comprising an insulating hydrophobic resin and a non-photosensitive, inorganic pigment in a ratio of 0 up to no more than 30 parts by weight per 100 parts by weight of said resin, said non-photosensitive, inorganic pigment in both the recording layer and the insulating layer being selected from the group consisting of calcium carbonate, lithopone, clay, talc, silica, starch, beryllium oxide, and magnesium oxide, and said insulating hydrophobic resin in both the recording layer and the insulating layer being selected from the group consisting of polyvinyl acetate, polyvinyl chloride, polyvinylidene chloride, polyacrylate, polysiloxane, polystyrene, vinyl chloride-vinyl acetate copolymer, and methyl methacrylateethyl acrylate copolymer.

3,998,988

CONJUGATE FIBER, FIBROUS MATERIAL AND FIBROUS ARTICLE MADE THEREFROM AND PROCESS FOR PRODUCTION THEREOF

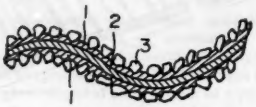
Akiro Shimomai, Iwakuni; Iwao Fujimoto, Waki; Isao Hamana, Iwakuni, and Kiyoji Katayama, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 509,259, Sept. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 210,766, Dec. 22, 1971, abandoned. This application July 11, 1975, Ser. No. 595,167

Claims priority, application Japan, Dec. 24, 1970, 45-118370; May 4, 1971, 46-29594; June 11, 1971, 46-41534

Int. Cl.[2] B32B *27/34*; D02G *3/00*

U.S. Cl. 428—400 4 Claims



1. A fibrous adsorptive material in the form of tow, web, fabric, sheet, block, ball or flock consisting of a sheath-and-core conjugate fiber of a high melting polyethylene terephthalate core component and polystyrene as a low melting polymer sheath component, said low melting polymer sheath component having a melting point at least 40° C lower than that of the high melting polyethylene terephthalate core component, both components being present as continuous phases, finely divided particles of an adsorbent embedded in the surface of said low melting polymer component, said adsorbent being selected from the group consisting of active carbon, active clay, active alumina, silica gel, active zeolite, molecular sieve, white carbon, cyclodextrin, ion-exchange resins, copper, platinum, silver, zinc oxide, nickel oxide, manganese oxide, cobalt oxide and cerium oxide, and said finely divided particles of said adsorbent being firmly secured by melt-adhering to the surface of said low melting polymer component with the bottom portions of said finely divided particles of said adsorbent being embedded therein by heating the conjugate fiber at a temperature higher than the melting point of the low melting polymer component contained in said conjugate fiber, but lower than the melting point of the high melting polyethylene terephthalate component contained therein.

3,998,989

METHOD AND COMPOSITION FOR LUBRICATING AND LUBRICATED SUBSTRATES

Robert P. Pardee; Archie L. Bickling, Jr., and Thomas J. Loran, all of Boulder, Colo., assignors to Ball Brothers Research Corporation, Boulder, Colo.

Division of Ser. No. 507,826, Sept. 20, 1974, Pat. No. 3,954,637, which is a division of Ser. No. 373,577, June 25, 1973, Pat. No. 3,862,860. This application Oct. 24, 1975, Ser. No. 625,447

Int. Cl.[2] C10M *7/28*; G03C *1/78*; G11B *5/00*

U.S. Cl. 428—409 8 Claims

1. A lubricated substrate, comprising: the substrate having thereon a coating comprised of a copolymer of trifluorochloroethylene and vinyl chloride and a tetrafluoroethylene telomer.

3,998,990

SUBSTRATES ADHERED VIA IONOMER RESINS

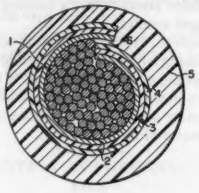
Isamu Iwami, Tokyo; Hironobu Kawasaki, Yokohama, and Kenichi Hattori, Kawasaki, all of Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 299,618, Dec. 11, 1972, abandoned. This application Jan. 15, 1975, Ser. No. 541,096

Claims priority, application Japan, Oct. 11, 1971, 46-79496; July 11, 1972, 47-69480

Int. Cl.[2] B32B *17/10*

U.S. Cl. 428—442 14 Claims



1. A laminate having a layer of an adhesive metal ion-containing copolymer placed between at least two kinds of substrates selected from the group consisting of metals, glasses, polyolefins, polyamide resins, vinyl chloride resins and vinylidene chloride resins, said metal ion-containing copolymer consisting of the following monomeric units:

$$\text{—(CH}_2\text{—CH}_2\text{)}_a\text{—}; \quad \text{—(CHR''—CR'}_2\text{)}_b\text{—}; \quad \text{—(CHR''—CR'}_2\text{)}_c\text{—};$$

$$\text{COOH} \qquad \text{COOM}$$

[A] [B] [C]

and —(CHR''—CR'$_2$)$_d$— (COOR)

[D]

wherein

A. is monomeric units of ethylene;

B. is monomeric units of an α,β-ethylenically unsaturated carboxylic acid having 3 to 9 carbon atoms;

C. is monomeric units of a metal salt of an α,β-ethylenically unsaturated carboxylic acid having 3 to 9 carbon atoms; and

D. is monomeric units of an α, β-ethylenically unsaturated carboxylic acid ester having 4 to 10 carbon atoms, and

M is a metal; R is a lower alkyl; R′ is hydrogen or a lower alkyl having 1 – 5 carbon atoms; and R″ is hydrogen or a lower alkyl having 1 – 5 carbon atoms; and a, b, c and d are the mol numbers of [A], [B], [C] and [D], respectively and have therebetween satisified the requirements of the following relations:

$$\frac{b+c+d}{a+b+c+d} \times 100 = 0.5 \text{ to } 25 \text{ \% by mol,} \qquad \text{(i)}$$

$$\frac{b+c}{b+c+d} \times 100 = 30 \text{ to } 99 \text{ \% by mol,} \qquad \text{(ii)}$$

and

$$0 < \left(\frac{c}{b+c} \times 100 \right) < 10 \text{ \% by mol} \qquad \text{(iii)}$$

where a, b, c and d are the total number of mols of each monomer unit [A], [B], [C] and [D], respectively, in the copolymer.

3,998,991

TRANSPARENT ABRASION-RESISTANT COATING FOR A STYRENE ACRYLONITRILE COPOLYMER AND METHOD

Roger L. Kaas, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 29, 1974, Ser. No. 456,069

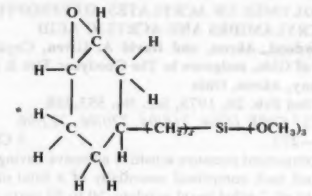
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² B32B *9/04*; B05D *3/10*

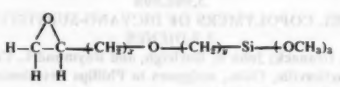
U.S. Cl. 428—447 5 Claims

1. A transparent, abrasion-resistant article comprising a styrene-acrylonitrile resin base layer and a coating layer integrally bonded to said base layer consisting essentially of the dried condensation reaction product of, by weight, from

1. 1 to 10 parts of partially hydrolyzed poly(vinyl acetate),
2. 10 to 50 parts of tetraethyl orthosilicate, said silicate being previously equilibrated in the presence of water, and
3. from ½ to 15 parts of a silane compound selected from the group consisting of those compounds described by the general formula:



where x is from 1 to 10 and those indicated by the general formula:



where x is from 1 to 10 and y is from 1 to 10, said trimethoxy functionality of said silane being initially hydrolyzed in said solution, said condensation reaction product being essentially a crosslinked matrix.

3,998,992

BONDING OF RUBBER TO METAL

Hiroshi Nakamura, Hyogo, Japan, assignor to Honny Chemicals Co., Ltd., Kobe, Japan

Filed June 18, 1975, Ser. No. 587,982

Claims priority, application Japan, June 26, 1974, 49-73109; July 3, 1974, 49-76166

Int. Cl.² B32B *15/06*, *25/02*

U.S. Cl. 428—451 24 Claims

1. In a process of bonding a rubber to a ferrous metal substrate wherein an adhesive is applied to said metal substrate and the rubber is contacted therewith and bonded by heat and pressure, the improvement comprising (1) using an adhesive consisting essentially of an interpolymer comprising about 39–99 percent by weight of a conjugated diene, about 1–60 percent by weight of a heterocyclic nitrogen base and 0 to about 40 percent by weight of at least one additional copolymerizable monomer and (2) using a rubber containing about 5–60 parts of silica filler per 100 parts of rubber, said silica having a purity on an anhydrous weight basis of at least 95 percent.

13. A laminated article comprising a ferrous metal substrate having bonded thereto a rubber by means of an adhesive layer, said rubber containing about 5–60 parts of silica filler per 100 parts of rubber, said silica having a purity on an anhydrous weight basis of at least 95 percent and said adhesive consisting essentially of an interpolymer comprising about 39–99 percent be weight of a conjugated diene, about 1–60 percent by weight of heterocyclic nitrogen base and 0 to about 40 percent by weight of at least one additional copolymerizable monomer.

3,998,993

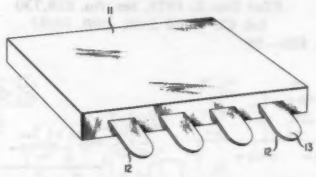
ELECTRICAL DEVICE HAVING A METAL SURFACE BEARING A CORROSION INHIBITOR

Edwin Arthur Chandross, Berkeley Heights, and Coralie Anne Pryde, Morristown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 9, 1975, Ser. No. 584,869

Int. Cl.² B32B *15/08*, *27/00*

U.S. Cl. 428—461 3 Claims



1. Electrical device having a metal surface selected from the group consisting of copper and its alloys to at least a portion of which electrical connections are to be made by soldering, and having a coating on said portion which protects it against surface deterioration which would tend to render such soldering more difficult but through which coating soldering can be effected, said coating comprising successively a surface film of a benzotriazole-copper complex and a layer of a polymer selected from the group consisting of

a. homopolymers formed by polymerization of a methacrylate monomer of the general formula

wherein R is selected from the group consisting of alkyl radicals of the general formula C_nH_{2n+1} wherein n is an integer from 1–6, and

b. copolymers formed by copolymerization of at least one methacrylate monomer of said general formula wherein R is selected from the group consisting of alkyl radicals of the general formula C_nH_{2n+1} wherein n is an integer from 1–6, and a glycidyl radical, the said glycidyl monomer being present in said copolymer in an amount ranging up to 10 percent, by weight.

3,998,994

MODIFIED COPOLYMERS

Jean-Claude Decroix, St. Nicolas les Arras, and Adrien Nicco, Bethune, both of France, assignors to Ethylene Plastique, Courbevoie, France

Continuation of Ser. No. 396,405, Sept. 12, 1973, abandoned, which is a continuation of Ser. No. 237,948, March 24, 1972, abandoned. This application May 12, 1975, Ser. No. 576,544

Claims priority, application United Kingdom, Mar. 25, 1971, 7854/71

Int. Cl.² C08F *8/14*, *8/32*

U.S. Cl. 526—15 13 Claims

1. A modified ethylene-maleic anhydride copolymer com-

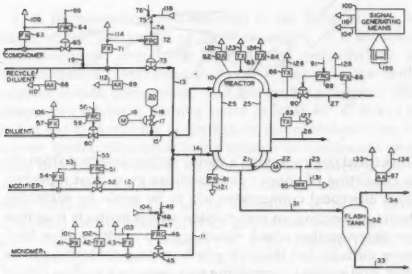
position which comprises a malaxed statistical copolymer of ethylene and maleic anhydride having a melt index of between 0.1 and 500 dg/min. in the molten state and containing between 0.5 and 20% by weight of units derived from maleic anhydride and at least one chemical reagent containing at least two reactive groups which are amine or alcoholic —OH groups but at most one primary or secondary amine group and at least one alcoholic —OH group, wherein the chemical reagent is present in an amount such that the total number of primary amine, secondary amine and alcoholic —OH groups of said reagent to the number of anhydride groups of the copolymer is between 0.05 and 1.

3,998,995

POLYMERIZATION METHOD AND APPARATUS

Russel A. Buss, Bartlesville, Okla.; Ralph Cox, Houston, Tex., and Jim B. Palmer, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 2, 1974, Ser. No. 528,730
Int. Cl.² C08F *2/06, 2/00, 10/02*
U.S. Cl. 526—59 **48 Claims**



1. A method for controlling a polymerization reaction, said method comprising the steps of:

generating a monomer concentration signal representative of the concentration of an unpolymerized monomer within a reaction zone;

controlling the flow rate of said monomer to said reacton zone in response to a preselected production rate set point signal representative of a desired rate of production of polymer within said reaction zone to provide monomer feed sufficient to maintain a preselected production rate; and

automatically ceasing said step of controlling the flow rate of said monomer to said reaction zone in response to said production rate set point signal and initiating the step of controlling the flow rate of said monomer to said reaction zone in response to said monomer concentration signal to maintain monomer concentration within said reaction zone below a predetermined level, when said monomer concentration signal exceeds a predetermined value.

3,998,996

PROCESS FOR THE MANUFACTURE OF A MIXED CATALYST

Tibor Tóth, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 19, 1975, Ser. No. 559,713
Claims priority, application Germany, Mar. 21, 1974, 2413513; Apr. 9, 1974, 2417150
Int. Cl.² C08F *4/02, 10/02*
U.S. Cl. 526—114 **13 Claims**

8. A mixed catalyst as a reaction product of (1) a chromium-III compound of the formula $CrX'_3.nH_2O$ wherein X' is Cl or Br, n is 1 to 10, $[Cr(H_2O)_6](CH_3CO_2)_3$ and $[Cr(H_2O)_6](HCO_2)_3$, and (2) a metal alcoholate in admixture with an organo metallic compound as an activator therefor of the formula $Me^4R'axp\text{-}q$ wherein Me^4 represents a metal of the Ist, IInd, IIIrd, or IVth main group or of the IInd subgroup of the periodic system, R' represents a hydrocarbon radical having from 1 to 16 carbon atoms, X represents hydrogen, a halogen atom or alkoxy or dialkylamine radicals having from 1 to 8 carbon atoms, p represents the valency of Me^4 and q represents an integer corresponding to 1 q p, and wherein said metal alcoholate is of the formula

$$[Me^1{}_x(OR)_z]Me^2{}_yMe^3{}_wH_v$$

wherein Me^1, Me^2, Me^3 each means a metal of the Ist, IInd, IIIrd or IVth main group or of the Ist, IInd, IVth and Vth subgroup of the periodic system of elements, or iron, cobalt, or nickel, R is a hydrocarbon radical having from 1 to 20 carbon atoms, x is an integer from 1 to 5, y is an integer from zero to 2, z is an integer from zero to 2, v is an integer from 2 to 8 and w is either zero or 1, with the proviso that (valency Me^1).x + (valency Me^2).y + (valency Me^3).$z + w = v$ in a molar ratio of chromium to metal in said alcoholate being 1 : 1 to 1 : 10.

3,998,997

PRESSURE SENSITIVE ADHESIVES USING INTERPOLYMER OF ACRYLATES, OXYPROPYL ACRYLAMIDES AND ACRYLIC ACID

Syed K. Mowdood, Akron, and David A. Given, Cuyahoga Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 26, 1975, Ser. No. 553,358
Int. Cl.² C08F *18/04, 218/04, 220/06, 222/06*
U.S. Cl. 526—271 **9 Claims**

1. A one-component pressure sensitive adhesive having high peel, shear and tack comprised essentially of a total of 100 parts by weight of; 2-ethyl hexyl acrylate, 50 to 60 parts; ethyl acrylate, 35 to 45 parts; acrylic acid, 1 to 3 parts; and diacetone acrylamide or diacetophenone acrylamide, 2 to 5 parts.

3,998,998

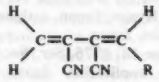
NOVEL COPOLYMERS OF DICYANO-SUBSTITUTED 1,3-DIENES

Carl A. Uraneck; John E. Burleigh, and Raymond L. Cobb, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 13, 1975, Ser. No. 540,570
Int. Cl.² C08F *220/70, 234/00, 222/30, 220/42*
U.S. Cl. 526—295 **7 Claims**

1. Copolymers having an alternating structure resulting from the polymerization of a mixture of:

a. from about 10–90 weight percent of a 2,3-dicyano-1,3-diene of the formula



wherein R is one of hydrogen, methyl, ethyl, or n-propyl, and from about 90–10 weight percent of

b. at least one conjugated diene having from 4 to 12 carbon atoms, or

c. at least one vinylaromatic compound.

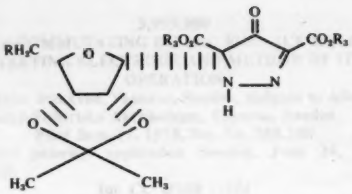
3,998,999

PROCESS FOR PREPARING PYRAZOMYCIN AND PYRAZOMYCIN B

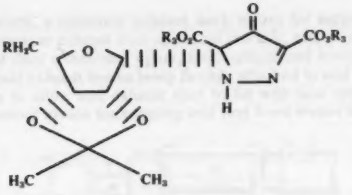
Silvano De Bernardo, Montclair, and Manfred Weigele, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Oct. 20, 1975, Ser. No. 624,074
Int. Cl.² C07H *3/02*
U.S. Cl. 536—1 **4 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of benzoyl, monohalo or mono-nitro substituted benzoyloxy groups and di-halo or di-nitro substituted benzoyloxy groups; and R_3 is lower alkyl.



wherein R is selected from the group consisting of benzoyl, monohalo or mono-nitro substituted benzoyloxy groups and di-halo or di-nitro substituted benzoyloxy groups; and R_3 is lower alkyl.

3,999,000

SELF-COMMUTATING DC ARC FURNACE HAVING STARTING ELECTRODE AND METHOD OF ITS OPERATION

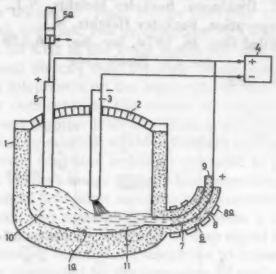
Sven-Einar Stenkvist, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed June 19, 1975, Ser. No. 588,180

Claims priority, application Sweden, June 24, 1974, 7408235

Int. Cl.² H05B 7/144

U.S. Cl. 13—9 R 4 Claims



1. A DC electric arc furnace comprising a hearth having an electrical connection for a melt in the hearth and which has an inner surface directly exposed inside of the hearth and which is electrically conductive at all times, at least one arcing electrode positioned for arcing with metal in the hearth, at least one starting electrode having means for moving it into contact with a charge of solid pieces in the hearth and for withdrawing the starting electrode from that charge after the charge becomes a melt for said connection, a DC power source for the furnace, and means for placing said electrode and said connection in an electric circuit with said source with both said connection and starting electrode directly connected together therewith with the same polarity and the arcing electrode connected to have an opposite polarity, so that said source is mainly connected through the starting electrode initially when starting the furnace with said charge and with formation of a melt therefrom automatically commutates to said connection with said arcing electrode continuously arcing via initially the solid pieces and subsequently to the melt.

3,999,001

ARC FURNACE FUMES CONTROL SYSTEM

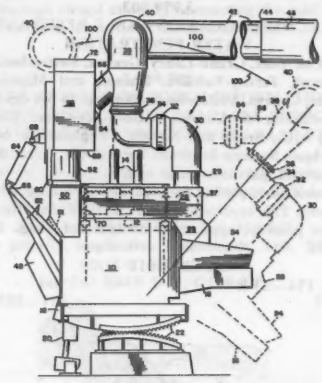
Robert C. Overmyer, and Pramodh Nijhawan, both of Indianapolis, Ind., assignors to Hawley Manufacturing Corporation, Indianapolis, Ind.

Continuation-in-part of Ser. No. 616,155, Sept. 24, 1975. This application Mar. 8, 1976, Ser. No. 664,947

Int. Cl.² F27D 17/00

U.S. Cl. 13—10 12 Claims

1. In a fumes control system for an electric arc furnace comprising a crucible providing an upwardly directed mouth, a roof covering said mouth, said roof being movable into an opening position away from said mouth, a plurality of arc electrodes extending downwardly through said roof, said crucible having at least one pouring spout opening therein and being tiltable for tapping, said control system comprising exhaust means, first hood means for collecting fumes generated during furnace operations from said roof, said first hood means being movable with said roof to expose said mouth, the improvement comprising charging hood means for movement into a use position in close overlying relationship with said mouth when said first hood means and said roof are moved away from said mouth, said charging hood means having an opening therein through which said crucible is charged, said charging hood means also having a storage position away from said mouth, a columnar exhaust duct, means for supporting said columnar exhaust duct upon said crucible, said columnar exhaust duct comprising upper, intermediate and lower portions, said exhaust means being flexibly attached to said lower portion to allow said exhaust duct to tilt with said crucible, first conduit means for coupling said first hood means to said



upper portion when said roof is covering said mouth, said intermediate portion including means for supporting said charging hood means from said columnar exhaust duct for movement between said storage and use positions and for coupling said charging hood means to said exhaust duct when said charging hood means is in said use position.

3,999,002

TERMINAL CONNECTOR FOR HIGH-ENERGY ELECTRIC CABLES WITH INTERNAL COOLING

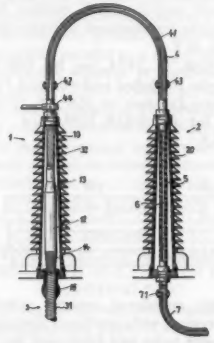
Werner Rasquin, Cologne, Germany, assignor to Felten & Guilleaume Kabelwerke AG, Cologne, Germany

Filed June 27, 1975, Ser. No. 591,066

Claims priority, application Germany, Aug. 8, 1974, 2438166

Int. Cl.² H01B 7/34, 17/54

U.S. Cl. 174—15 BH 11 Claims



1. A cable assembly comprising, in combination, an internally cooled high-energy cable having a cooling channel of a predetermined flow-through cross section for passage of a cooling medium therethrough; and a terminal connector including a current-carrying first terminal connector assembly connected to said cable, a second terminal connector assembly for the cooling medium having a channel for passage of the cooling medium therethrough, the flow-through cross-section

of said channel being smaller than said predetermined flow-through cross section of said cooling channel of said cable, and means for conducting the cooling medium from one of said assemblies to the other and communicating said channel with said cooling channel of said cable.

3,999,003

TELECOMMUNICATION CABLE RESISTANT TO WATER PENETRATION

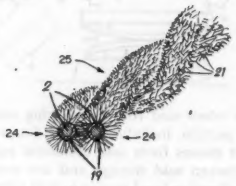
Gerard Chevrolet, Grand-Lancy, Geneva, Switzerland; Claude Guignard, Ferney-Voltaire, France, and Maurice Poull, Meyrin, Geneva, Switzerland, assignors to SA des Cableries et Trefileries de Cossonay, Cossonay-Gare; Kabelwerke Brugg A.G., Brugg and Societe d'Exploitation des Cables Electriques Systeme Berthoud Borel & Cie, Cortaillod, all of, Switzerland, part interest to each

Continuation-in-part of Ser. No. 388,589, Aug. 15, 1973, abandoned. This application Nov. 26, 1975, Ser. No. 635,639

Claims priority, application Switzerland, Aug. 18, 1972, 12254/72

Int. Cl.² H01B *11/02*

U.S. Cl. 174—23 R **9 Claims**



1. A cable for an electric signaling system, comprising an envelope and a plurality of conductors disposed close to one another in said envelope, each conductor including a metallic core surrounded by a dielectric sheath and a multiplicity of nonconductive fibers partly embedded in said sheath and extending generally radially therefrom, the fibers of adjacent conductors interpenetrating in an intervening space and maintaining the relative position of said conductors in said envelope.

3,999,004

MULTILAYER CERAMIC SUBSTRATE STRUCTURE

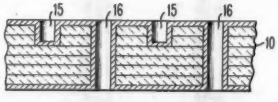
Octavio I. Chirino; Joseph Hromek, both of Endwell; Kailash C. Joshi, Endicott, and George C. Phillips, Jr., Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 27, 1974, Ser. No. 509,772

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² H05K *1/04, 1/14*

U.S. Cl. 174—68.5 **9 Claims**



1. A monolithic multilayer ceramic substrate electrical interconnection system with interlayer electrical connecting by means of through holes and fabricated by:

drilling a plurality of green sheet lamina in accordance with a predetermined hole pattern,

stacking a holed green sheet laminae with binder rich sides up to form a laminar assembly,

stacking the uppermost green sheet lamina with a polyethylene-terephthalate carrier attached and adapted to function as a mask,

attaching the laminar stack to a rotatable wheel,

filling the hole formations formed by the laminar stacking with a metal paste composition including 70 to 90% molybdenum powder,

rotating the wheel to remove excess metal paste and evenly coat the side walls of the hole formations,

removing the mask carrier from the uppermost green sheet lamina,

metallizing the top and bottom surfaces of the green sheet laminar assembly with predetermined circuit patterns, and

sintering the laminar assembly.

3,999,005

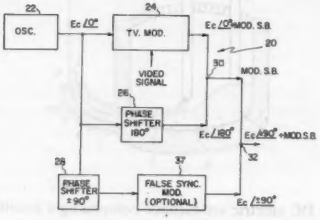
SECURE TRANSMISSION OF AM OR FM SIGNALS

Robert V. C. Dickinson, Berkeley Heights, N.J., assignor to ECom Corporation, Berkeley Heights, N.J.

Filed Dec. 26, 1974, Ser. No. 536,539

Int. Cl.² H04N *1/44*

U.S. Cl. 358—259 **16 Claims**



1. A method of scrambling a modulated signal for secure transmission thereof, said signal including carrier and sideband components having a predetermined proper phase relationship with one another, said method comprising shifting the phase of the carrier component of said modulated signal relative to the sideband components thereof by from 80 to 100 carrier degrees, said phase shifting of the carrier component being effected by adding to said modulated signal a signal having the same frequency as that of said carrier component and displaced in phase therefrom by $(A + 180°)/2$, where A is from 80° to 100°, the amplitude of the added signal being $(\sin A/\sin(180°-A))$ times that of said carrier component.

3,999,006

VISITOR CONFIRMATION SYSTEM

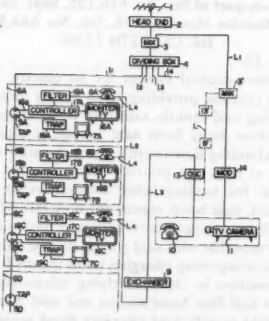
Takeshi Takeuchi, and Yukio Manabe, both of Yokohama, Japan, assignors to Hochiki Corporation, Tokyo, Japan

Filed Oct. 21, 1974, Ser. No. 516,700

Claims priority, application Japan, Oct. 24, 1973, 48-118893

Int. Cl.² H04N *7/02*

U.S. Cl. 358—85 **7 Claims**



1. A visitor confirmation system utilized with a CATV or MATV system and with a telephone system for monitoring visitors to subscriber's premises comprising a television cam-

era for producing a visitor's image signal, monitoring television receivers in said subscriber's premises for receiving the visitor's image signal from said television camera, conventional television receivers in said subscriber's premises, a call-up telephone for use by a visitor, telephones in said subscriber's premises, a telephone switchboard between said call-up telephone and said subscriber's telephones which combines said visitor's image signal from said television camera with the commercial television signal transmitted through said CATV or MATV sytem, call signal generator means operable to transmit a call signal at a frequency of 20 Hz or less or 30 KHz or over along with a call-up signal derived from operation of the visitor's telephone to select a corresponding subscriber's telephone, filter means operable to block telephone signals from said call up telephone of a frequency of 20 Hz through 30 KHz in the voice frequency band and to pass said call signal directly therethrough, means connecting said subscriber's telephones on the input side of said filter means, a controller connected to the output of said filter, a power source for said monitor television, said controller including a relay operated by said call signal to connect said power source to said monitor television receivers operable to prevent passage of said visitor's image signal while permitting passage of said commercial television signal to said conventional television receivers, and a telephone line wherein a call signal is transmitted concurrently with said call-up signal for selecting the corresponding subscriber's telephone to cause said power source to be connected by the operation of said controller to said subscriber's monitor television to switch on the latter, reproducing the visitor's image on said monitor television for confirmation and identification.

3,999,007

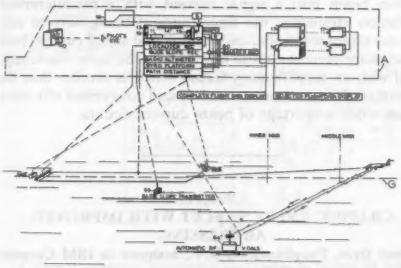
AIRCRAFT VISUAL APPROACH/LANDING REPRODUCER DEVICE AND SYSTEM

Carl Joseph Crane, Box 17745, San Antonio, Tex. 78217

Filed Oct. 9, 1975, Ser. No. 621,064

Int. Cl.[2] H04M 7/18

U.S. Cl. 358—104 **5 Claims**



1. An airborne visual approach/landing reproducer device and system comprising a miniature runway fixed within the aircraft, an endless belt with horizon line and cloudspace depicted thereon positioned beyond the far end of the said miniature runway, a video camera mounted for multiple degrees of freedom in proximity to the said miniature runway, means for positioning the video camera proportionately and in exact scalar value to the position and movements of the said aircraft with respect to its selected ground-based runway, gyro means for tilting the video camera about its three axes that correspond to the tilt of the said aircraft about its axes of roll, pitch and yaw, airborne electronic receivers responsive to ground transmitters that define runway longitudinal axis, glide slope axis, path distance to and along the said ground runway, marker beacon, a radio altimeter, a navigational transceiver, electrical, electronic, and photoelectric circuitry interconnecting the said video camera drive means for positioning the said video camera, a cathode ray tube for presenting to the aircraft pilot the imagery detected by the aid video camera as it approaches the said miniature airborne runway and means for raising or lowering the said horizon line in unison with the raising and lowering of the said video camera, and additional video cameras located within the said aircraft for focusing on installed instruments, and switching means for selecting and/or mixing one or the other of said additional video camera outputs through closed circuitry connecting the said cathode ray tube visible to the pilot of the said aircraft.

3,999,008

RECORD CARRIER ON WHICH INFORMATION IS STORED IN AN OPTICALLY READABLE STRUCTURE WITH DITHER FOCUSSING SIGNALS ALSO BEING STORED

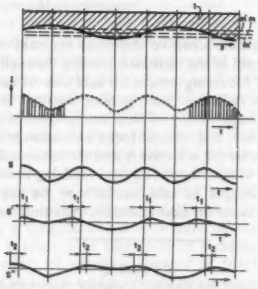
Gijsbertus Bouwhuis, and Christiaan Hendrik Frans Velzel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 464,841

Claims priority, application Netherlands, Feb. 14, 1974, 7402012

Int. Cl.[2] H04N 5/76; G11B 7/24

U.S. Cl. 358—128 **3 Claims**



1. A record carrier on which information is stored in an optically readable structure of areas and intermediate regions arranged along elongated tracks, said structure being readable with a servo focussed read beam of radiation, said areas having a different influence on said read beam of radiation than the intermediate regions, said areas having a length dimension in a direction substantially parallel to said tracks and a width direction substantially parallel to a major surface of said carrier, the improvement wherein at least one of said major surfaces of the record carrier exhibits periodic excursions of fixed amplitude and frequency in a direction perpendicular to said length and width dimensions of said areas for introducing dither into said servo focussed read beam, the period and amplitude of said excursions being substantially greater than the average period of the areas in the tracks.

3,999,009

APPARATUS FOR PLAYING A TRANSPARENT OPTICALLY ENCODED MULTILAYER INFORMATION CARRYING DISC

Gijsbertus Bouwhuis, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 376,363, July 5, 1973, abandoned, which is a division of Ser. No. 227,210, Feb. 17, 1972, abandoned. This application Feb. 5, 1975, Ser. No. 547,099

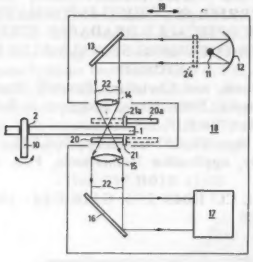
Claims priority, application Netherlands, Mar. 11, 1971, 7103233

Int. Cl.[2] H04N 5/76; G11B 7/12

U.S. Cl. 358—128 **7 Claims**

1. Apparatus for reading a transparent information carrier of the type wherein optically readable information signals are

arranged in a spiral on at least two spaced substantially parallel adjacent tracks in the form of spaced areas of an optically transparent material each having a surface coplanar with the corresponding surfaces of the other areas in the corresponding track and wherein the disc material between each coplanar surface and the next adjacent track is optically transparent, the apparatus comprising a source of radiation, first optical focussing means for converging said radiation onto said information carrier, the radiation propagating through at least two of said tracks to a side of the carrier opposite said radiation



source, a radiation-sensitive detector on said side of said carrier in the path of the radiation passing through the carrier, second optical focussing means on said side of said carrier in the path of said radiation beam passing through the carrier for focussing an image of any of said tracks onto said radiation-sensitive detector, and optical focus extension means on said side of said carrier for selectively and incrementally extending the focal point of said second optical focusing means, whereby each of said images of said tracks may be separately and selectively focussed on said radiation-sensitive detector.

3,999,010

LIGHT BEAM SCANNING SYSTEM

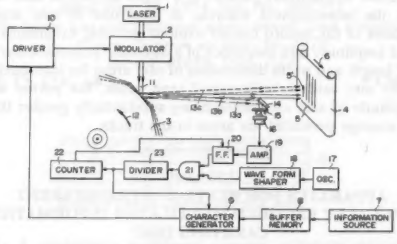
Shigenori Oosaka, and Masahiro Ohnishi, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 16, 1975, Ser. No. 623,263

Claims priority, application Japan, Oct. 18, 1974, 49-120478

Int. Cl.² H04N *5/84*

U.S. Cl. 358—302 **4 Claims**



1. A light beam scanning system comprising a laser beam source for generating a laser beam, a light modulator provided in the optical path of the laser beam for modulating the laser beam in accordance with a video signal supplied thereto, a rotating mirror for deflecting the laser beam incident thereon in one direction, a photodetecting means provided in the optical path of the laser beam deflected by said rotating mirror at an end of the deflection to receive the laser beam and generate a synchronizing signal, means for supplying a video signal to said light modulator, and means for supplying a video clock pulse to said video signal supplying means upon receipt of said synchronizing signal wherein the improvement comprising means for generating a base clock pulse the frequency of which is a plurality times as large as that of said video clock pulse, said base clock pulse being supplied to said video clock pulse supplying means for making the latter supply the video clock pulse.

3,999,011

METHOD AND SYSTEM FOR CONTROLLING ELECTRON BEAM QUANTITY IN CAMERA TUBE

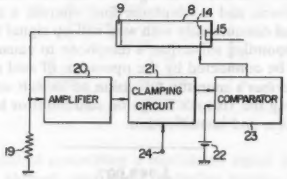
Kazuhiro Sato, Tokyo; Yoshizumi Eto, and Shizuka Ishibashi, both of Hachioji, all of Japan, assignors to Hitachi, Ltd. and Hitachi Electronics Co., Ltd., both of, Japan

Filed May 17, 1974, Ser. No. 471,049

Claims priority, application Japan, May 21, 1973, 48-55715

Int. Cl.² H04N *3/16*

U.S. Cl. 358—219 **4 Claims**



1. A method of controlling the quantity of an electron beam in a photoconduction type camera tube comprising the steps of scanning a target electrode of said camera tube with an electron beam whose quantity is controlled by a beam current control electrode of said camera tube thereby converting said electron beam into a signal current with a predetermined conversion efficiency, the signal current being derived only from the target electrode, and feeding said signal current back to said beam current control electrode in the form of a voltage signal with an amplification factor which is smaller than the reciprocal of the maximum value of said conversion efficiency at least when a shortage of beam current occurs.

3,999,012

GRAPHIC ENTRY TABLET WITH IMPROVED ADDRESSING

Herbert Dym, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Filed July 7, 1975, Ser. No. 593,895

Int. Cl.² G08C *21/00*

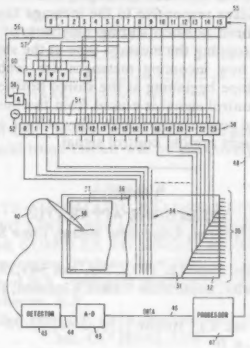
U.S. Cl. 178—18 **7 Claims**

1. A tablet of the type having a plurality of X dimension wires and a plurality of Y dimension wires arranged to be electrically coupled to a pen, means including a plurality of X dimension and Y dimension drivers for producing an electrical signal on the wires to be recieved by the pen for producing a pen position address, and means for controlling the drivers of a selected dimension to produce a selected activation pattern having a 0 to 1 transition at the pen position, wherein the improvement comprises,

means coupling each driver for the X dimension and each driver for the Y dimension to a plurality of wires of the corresponding dimension in a repeating pattern in which 0 to 1 transitions in the activation pattern occur at a plurality of positions,

means for controlling said drivers to produce 1 to 0 transi-

tions in the activation pattern midway between said 0 to 1 transitions, and



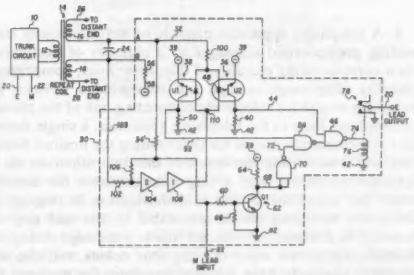
means for identifying the address of the 0 to 1 transition of the pen position.

3,999,013

BI-DIRECTIONAL SIGNALING APPARATUS

Thomas D. Reed, Plano, and Kenneth L. Propes, Dallas, both of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 23, 1976, Ser. No. 660,297
Int. Cl.² H04L *25/02*
U.S. Cl. 178—58 A **9 Claims**



1. Signal detector apparatus including A, E and M leads for connection to corresponding leads of a communication system wherein said A and M leads vary between first and second logic values, comprising, in combination:

first opto-isolator sensing means connected between the A and M leads for providing an output of a given logic value upon sensing a first direction of current flow between said A and M leads;

second opto-isolator sensing means connected between the A and M leads for providing an output of the given logic value upon sensing a second direction of current flow between said A and M leads;

logic value detection means connected to said M lead for providing an output of the given logic value upon detection of a predetermined logic value of said M lead; and

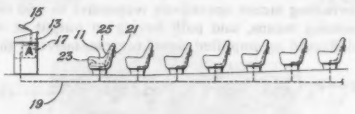
logic circuit means connected to said logic value detection means and to said first and second opto-isolator sensing means for receiving the logic value outputs therefrom, said logic circuit means providing an output to said E lead indicative of the logic value of said A lead.

3,999,014

PADDED FURNITURE FOR REVERENT ATMOSPHERE

Albert W. Bascom, Box 585, Keene, Tex. 76059

Filed July 22, 1974, Ser. No. 490,808
Int. Cl.² H04R *27/00*
U.S. Cl. 179—1 AT **4 Claims**



1. A combination for maintaining a reverent atmosphere in a sanctuary including:

a. a plurality of pews located in said sanctuary; said pews facing a lectern and arranged in front to back relationship; each pew having a seat, a back rest, and leg supports carrying said seat and back rest;

b. a lectern for a minister and the like;

c. a microphone at said lectern;

d. at least one amplifier connected to said microphone; and

the improvement comprising:

e. resilient padding on both front and back of said back rest; said padding extending over the major portion of said front for comfort and being disposed on at least the top and bottom of the back of said back rest for compensation for changes in dimension of a cover with changes in temperature and humidity and for absorbing energy and lessening wear from people rubbing their shoes and the like on a cover disposed over the padding;

f. a fabric cover that is suceptible to changes in dimension with changes in temperature and humidity and to wear from contact with shoes and the like; said fabric cover having a longitudinal stretch induced thereinto and fastened in place over said resilient padding;

g. a plurality of speakers located in front of and facing people seated in said pews and being disposed at least one for each pew such that no individual is more than 4 feet from a speaker to thereby provide a continuum of sound with no detectable blurring because of overlap; said speakers being connected respectively with the back of a pew in front so as to provide a solid backing for reinforcement of bass tones and covered with fabric so as to be invisible such that the hearer cannot even detect from whence the sound comes; and

h. each said speaker on each said pew being electrically connected to said at least one amplifier for a substantially uniform level continuum of sound for good hearing throughout said sanctuary without uncomfortable and irreverent loudness in one portion near a main speaker and without too low a sound for good hearing remote from said main speaker and without blurring from delayed sound from one main speaker mixing with sound from another main speaker at a different distance; said fabric cover and said padding absorbing acoustic energy also to reduce the overall noise level and increase the feeling of reverence and the ease of hearing in said sanctuary.

3,999,015

AIRCRAFT MULTI-COMMUNICATIONS SYSTEM

Dennis G. Snyder, Dallastown, and Eugene H. Paules, Red Lion, both of Pa., assignors to Genie Electronics Co., Inc., Red Lion, Pa.

Filed May 27, 1975, Ser. No. 581,024
Int. Cl.² G08B *3/10, 1/08*
U.S. Cl. 179—1 H **10 Claims**

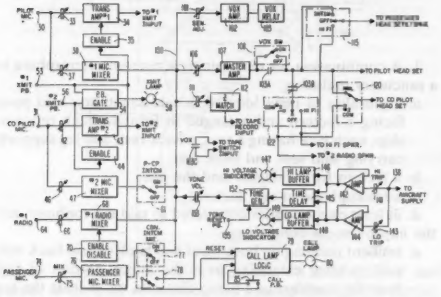
1. Communications apparatus for use in an aircraft, comprising:

a. a plurality of input paths, adapted to receive respective

electrical input signals, said input paths having outputs connected at a common connection point;

b. threshold sensing means, connected to said common connection, for sensing when the signal at said common connection point is above a predetermined threshold level;

c. a common amplifier path, having an input connected to said common connection point, and including threshold switching means operatively responsive to said threshold sensing means, said path having an output at which is delivered an amplified signal representative of the signal



provided at said common connection point as a function of the operation of said threshold sensing means;

d. a plurality of output transducers;

e. transducer switching means, connected to said amplifier output, for switchably connecting said output to respective ones of said output transducers; and

f. secondary switching means, including a switch responsive to said threshold switching means, and connected to said amplifier output, for switchably connecting secondary audio sources to said output transducers through said transducer switching means.

3,999,016

AUTOMATIC TELEPHONE ANSWERING AND MESSAGE RECORDING APPARATUS

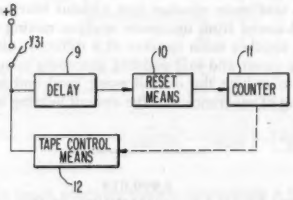
Tateki Ueda; Terumasa Shimizu, and Shinichi Oguma, all of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sept. 13, 1974, Ser. No. 505,694

Claims priority, application Japan, Sept. 14, 1973, 48-107018[U]

Int. Cl.² H04M *1/64*

U.S. Cl. 179—6 E **4 Claims**



1. In a remote signal-controlled automatic telephone answering and recording apparatus of the type including: an answer tape; a message recording tape; means responsive to an incoming calling signal for playing back the answer tape to the calling party and for recording the calling party's message on the message tape; and means responsive to a received remote control signal from a calling party for recording the signal on the message tape, rewinding the message tape and playing back the message tape over a telephone line to the calling party; the improvement comprising:

a. means for storing a position of the message tape during rewinding, said position being located between the beginning of the recorded remote control signal and the end of the last of the recorded messages; and

b. circuit means responsive to the message tape's returning to the stored position during playback of the message tape for stopping the message tape at the stored position, whereby new incoming messages are recorded on the message tape beginning at the stored position so that the remote control signal is erased from the message tape to permit the new messages to be played back in response to a subsequent remote control signal.

3,999,017

TELEPHONE APPARATUS

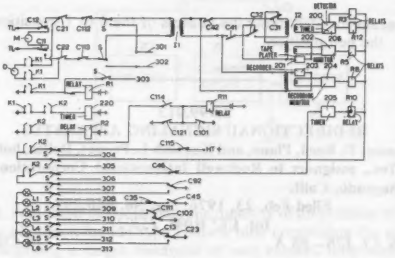
Donald James Thorne, Concourse House, Lime St., Liverpool, England

Filed Feb. 12, 1975, Ser. No. 549,281

Claims priority, application United Kingdom, Feb. 21, 1974, 7991/74

Int. Cl.² H04M *1/26, 1/64, 11/00*

U.S. Cl. 179—6 D **11 Claims**



1. A telephone apparatus capable of simultaneously transmitting pre-recorded messages to a plurality of destinations via a corresponding plurality of telephone lines, comprising: a plurality of message storage and transmission devices; first switching means for selectively connecting one of the plurality of telephone lines to the telephone apparatus; a single destination determination means for determining the desired destination and transmitting the result of the determination via the selected telephone line; a ring tone detector for detecting when the telephone at the said destination is ringing; and automatic switching means actuatable by the said ring tone detector to connect the selected line to a message storage and transmission device when the ring tone ceases, and also actuatable to disconnect the selected line from the message storage and transmission device when transmission of the message ceases, the said first switching means and automatic switching means being operable to successively connect each line to the destination determination means and to a different device without affecting previous line-to-device connections.

3,999,018

TIMER ASSOCIATED WITH CB RELAY

Uwe A. Pommerening, Webster, and Glenn L. Richards, Caledonia, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,591

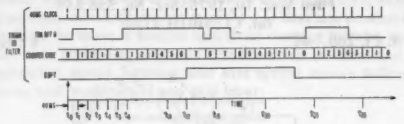
Int. Cl.² H04Q *3/20*

U.S. Cl. 179—18 FA **10 Claims**

1. In a telephone apparatus wherein a trunk circuit condition is monitored and signals corresponding to the seizure and non-seizure of said trunk circuit, respectively, are generated, the improvement comprising:

timing means, responsive to a change in the condition of said trunk circuit, for timing the duration of one of said signals and generating an output signal indicative of a

change in the condition of said trunk circuit, only upon the duration of one said signal exceeding a prescribed



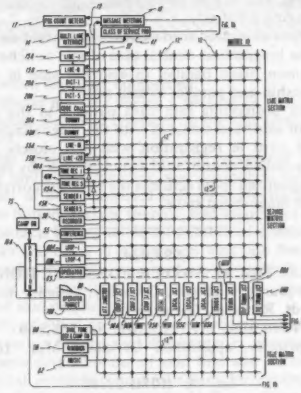
period of time, so that momentary changes in the condition of said trunk circuit will be effectively filtered.

3,999,019

PRIVATE AUTOMATIC BRANCH EXCHANGE PROVIDING LINE APPEARANCE CONNECTION OF OPERATOR COMPLEX TO SINGLE STAGE MATRIX

Uwe A. Pommerening, Webster, and Glenn L. Richards, Caledonia, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Mar. 25, 1975, Ser. No. 561,797
Int. Cl.² H04Q *3/00*
U.S. Cl. 179—27 FF **8 Claims**



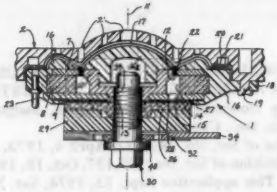
1. In an electronic telephone system including a plurality of input circuits comprising subscriber line circuits, a plurality of junctor circuits, a single stage switching matrix in the form of a rectangular array of horizontal and vertical lines and switch means for selectively effecting interconnection between a horizontal line and a vertical line at the cross point thereof, said input circuits being connected to respective horizontal lines and said junctor circuits being connected to respective vertical lines, and common control means for storing the respective multi-digit designations of selected calling and called input circuits and for periodically generating command signals to close selected cross points of said switching matrix to interconnect the calling and called input circuits whose designations are stored, the improvements comprising an operator complex including an operator position circuit connected to at least one operator line circuit which is connected in the manner of an input circuit as a line appearance to said switching matrix, first digit recognition means for recognizing the first digit of the multi-digit designation of a called input circuit generated from a line circuit, operator digit recognition means responsive to said first digit recognition means for recognizing a digit assigned to designate only the operator, and operator control means for controlling calls to and from the operator including first means responsive to said operator digit recognition means for controlling said common control to store the multi-digit designation of an operator line circuit as a called input circuit.

3,999,020

TRANSDUCER WITH VARIABLE FREQUENCY RESPONSE

Cedric R. Bastiaans, Brown Deer, and Joseph J. Chladil, Sr., Milwaukee, both of Wis., assignors to Koss Corporation, Milwaukee, Wis.

Filed Oct. 29, 1975, Ser. No. 626,788
Int. Cl.² H04R *1/28*
U.S. Cl. 179—180 **15 Claims**



1. In an audio transducer for a headphone having ports which couple the back surface of the transducer diaphragm to the interior of the headphone cup, the improvement comprising:

an acoustic damping material made of a resilient material which is disposed over said ports to affect the acoustic resistance thereof;

an adjustable clamp mounted to said audio transducer and including a compression plate which bears against said acoustic damping material to provide a compressive force which can be varied to adjust the acoustic resistance of said acoustic damping material; and

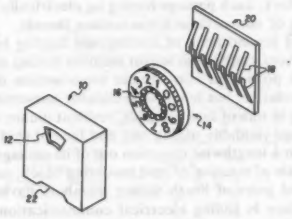
means coupling said adjustable clamp through an opening in the headphone cup to allow adjustment of the acoustic resistance of said ports from the exterior of said cup.

3,999,021

THUMBWHEEL ROTARY WAFER SWITCH HAVING ODD NUMBER DETENT POSITIONS AND ROTARY WAFER PRINTED CIRCUIT PATTERN

Tony M. Delp, Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 9, 1975, Ser. No. 621,177
Int. Cl.² H01H *1/56, 21/50;* **G05G** *5/06*
U.S. Cl. 200—11 DA **5 Claims**



1. Multiposition rotary switch apparatus comprising, in combination:

rotating wafer means, each position of the switch defining a different diameter on said wafer means;

a first set of electrically interconnected contacts located on a given surface of said wafer means on one radii of said diameter for each position of said switch apparatus;

a second set of electrically interconnected contacts located on said given surface of said wafer means on the other radii of said diameter for each position of said switch apparatus, said second set of contacts being physically positioned intermediate said first set; and

first and second symmetrically located electrical output

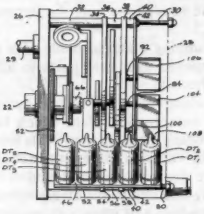
means electrically connected respectively to said first and second sets of contacts on each radii of said diameter.

3,999,022

ELECTRICAL BRUSH SENSOR APPARATUS USEFUL FOR ANALOG-TO-DIGITAL CONVERTERS

John Henry Hosemann, Cheyenne, Wyo., assignor to Ideal Aerosmith, Inc., Cheyenne, Wyo.

Continuation of Ser. No. 347,872, April 4, 1973, abandoned, which is a division of Ser. No. 190,137, Oct. 18, 1971, Pat. No. 3,754,239. This application Sept. 13, 1974, Ser. No. 505,670
Int. Cl.² H01H *19/00*; H03K *17/56*; H01R *39/00*; H02K *13/00*
U.S. Cl. 200—23 5 Claims



1. Electrical contact apparatus comprising:

first and second circular conductor strips,

a plurality of electrical contacts arranged sequentially in at least a portion of a circle,

a brush holder including a mounting block composed of an insulating material,

drive means for rotating said mounting block at a predetermined rate of speed,

first and second pairs of brush holder means disposed in said mounting block, each pair of brush holder means including a pair of passages arranged in spaced parallel relation to one another and to the axis of rotation of said mounting block, each passage having an electrically conductive lining of non-circular cross-section therein,

first and second pairs of leading and lagging brush sensor members, each brush sensor member having an elongated shank portion of non-circular cross-section disposed for non-rotative, but lengthwise slidable movement within a lining in one of said passages, resilient means within each passage yieldably urging one end face of said shank portion in a lengthwise direction out of its passage parallel to the axis of rotation of said mounting block, said first and second pairs of brush sensor members having one said end face in sliding electrical communication with a respective one of said first and second conductor strips, the other said end face of said first and second pairs of brush sensor members being arranged for sliding movement over said plurality of contacts,

electrical connecting means electrically interconnecting each of said leading sensor brush members together and each of said lagging brush members together, and

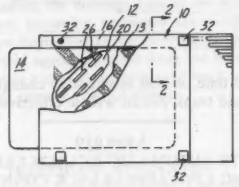
switching means coupled to said strips and said contacts for completing an electrical circuit therewith through the one of said pair of brush sensor members which is in established electrical communication with one of said contacts and for disabling an electrical circuit for the one of said pairs of brush sensor members which is in rotational transition between said contacts.

3,999,023

MAGNETIC CARD READER

Bruce S. Sedley, 7 Murray Ave., Larkspur, Calif. 94939

Filed Mar. 10, 1975, Ser. No. 556,655
Int. Cl.² H01H *43/08*
U.S. Cl. 200—46 6 Claims



1. A magnetic card reader having no internal biasing for reading a magnetized data card adapted to be placed in a predetermined position in said reader, said card having magnetizable points arranged in a predetermined arrangement to permit coding said card by magnetizing certain spots at certain of said points, said reader comprising:

a base having a flat side,

a plurality of elongated reed switches supported on said side with the longitudinal central axes of said switches lying in a common plane parallel to said flat side in coplanar relationship and parallel to said side,

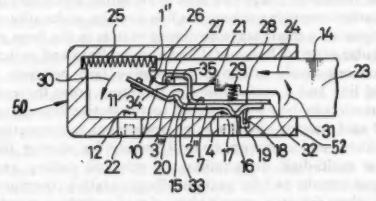
means for positioning said card parallel to the common plane of said reed switches with the magnetizable points of said card in registration with and closely adjacent corresponding ends of said switches whereby the flux of the magnetized spots actuates the switches corresponding to such magnetized spots.

3,999,024

ELECTRICAL SWITCH CONSTRUCTION

Ewald Marquardt, Rietheim, Germany, assignor to J. & J. Marquardt, Rietheim, Germany

Filed Mar. 17, 1975, Ser. No. 558,860
Claims priority, application Germany, Mar. 16, 1974, 2412812
Int. Cl.² H01H *21/40*
U.S. Cl. 200—68 19 Claims



1. An electric switch, comprising at least one fixed contact, a movable contact member having first and second arm portions disposed at angles to each other, at least one arm portion having a movable contact thereon movable with said contact member, an actuating member engageable with said movable contact member and being movable therealong over said second arm portion to engage said first arm portion and to pivot said first arm portion in a direction to move it toward said fixed contact, first spring means biasing said actuating member in a direction toward engagement with said movable contact member, said second arm portion being displaceable by movement of said first arm portion in a direction against the force of said first spring means to increase the biasing thereof, said actuating member comprising a lever having a

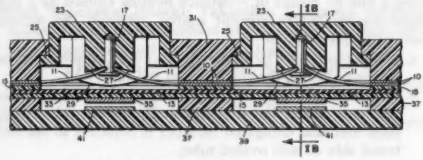
first lever portion overlying said second arm portion and an upwardly extending second lever portion, a pushbutton engageable with said lever arm portion to move said lever along said movable contact member to pivot said first arm portion in a direction to move it toward said fixed contact to raise said second arm portion against said first lever arm portion, and a compression spring forming said first spring means defined between said pushbutton and said lever.

3,999,025

LOW PROFILE TACTILE FEEDBACK KEYBOARD SWITCH ASSEMBLY

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 30, 1975, Ser. No. 600,400
Int. Cl.² H01H 13/44
U.S. Cl. 200—159 B 15 Claims



11. A switch assembly comprising:

a rigid planar member having a first set of interconnected individual electrical contacts on the top surface portion thereof;

a flexible diaphragm dielectrically separated from and above said planar member, said diaphragm having a second set of interconnected individual electrical contacts on the bottom surface thereof, said second set of electrical contacts having an equal number of contacts as said first set and being in registration with said first set;

an actuating member mounted above said flexible diaphragm for substantially perpendicular displacement toward said diaphragm;

a plurality of lobed protrusions extending from said actuating member toward said diaphragm in registration with corresponding contacts of said first and second sets of electrical contacts, said protrusions for causing engagement of selected contacts of said first and second set of electrical contacts when said actuating member is displaced against said diaphragm; and

planar biasing means for yieldingly resisting movement of said actuating member toward said flexible diaphragm, said biasing means compressing into a bowed configuration upon displacement of said actuating member and being adjustable as to the amount of resistance exerted upon said actuating member.

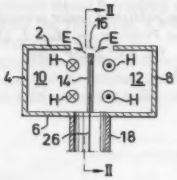
3,999,026

HEATING DEVICE FED WITH MICROWAVE ENERGY

Göran Böling, Taby, Sweden, assignor to Stiftelsen Institutet for Mikrovagsteknik Vid Teknishka Hogskolan i Stockholm, Stockholm, Sweden

Filed Feb. 13, 1975, Ser. No. 549,757
Claims priority, application Sweden, Feb. 22, 1974, 7402373
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 A 15 Claims

1. A device for heating material by microwave energy in a longitudinal heating area, comprising a resonator and a microwave energy source feeding the resonator, said resonator comprising a longitudinal cavity limited by walls (2,4,6,8), one (2) of said walls having a longitudinal slot (16), said resonator also comprising a separating wall (14) shorter than the cavity and having one edge attached to the wall (6) opposite to the slot (16), said separating wall (14) being parallel to the slot and extending from the wall (6) towards said slot and thereby dividing at least a part of the cross section surface of the cavity into two chambers, said separating wall (14) also being provided with a feeding device comprising at least one conductor (26) inserted through an opening in the resonator wall (6) and connected to the separating wall (14), the conductor (26), as seen in cross section through the resonator, is



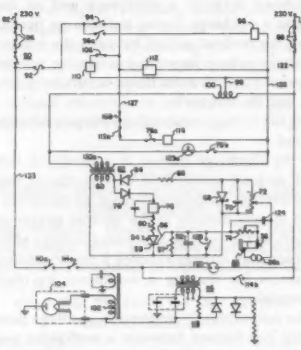
arranged symmetrically to the separating wall (14) and connected to a portion (24) of that edge of the wall (14) which is turned to the resonator wall (6) where the conductor (26) is attached and which edge portion (24) is free from said resonator wall, whereby a magnetic field will be generated closing itself around said separating wall (14) in the resonator, and a corresponding electric field will be generated between the edges of the slot (16) and the free edge of the separating wall.

3,999,027

ELECTRONIC MICROWAVE OVEN CONTROL SYSTEM AND METHOD OF PREPARING FOOD ITEMS THEREWITH

Donald G. Moore, Glencoe, Ill., assignor to Chemetron Corporation, Chicago, Ill.

Filed May 5, 1975, Ser. No. 574,430
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 B 13 Claims



1. In an electromagnetic oven, the combination of

a cavity in which items to be heated are placed,

means for supplying electromagnetic energy to said cavity,

energy level detecting means for developing an electrical signal proportional to the level of electromagnetic energy in said cavity when an item to be heated is positioned therewithin,

means for intergrating said electrical signal to develop a ramp type electrical signal which changes with respect to time,

means for comparing said ramp signal with a reference signal, and

means controlled by said comparing means for terminating the supply of electromagnetic energy to said cavity.

3,999,028
METHOD AND APPARATUS FOR ELECTRICAL DISCHARGE MACHINING

Nagao Saito, Nagoya; Kazuhiko Kobayashi, Seto, and Toshiro Oizumi, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

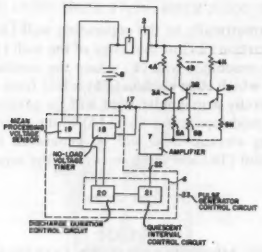
Filed Dec. 19, 1973, Ser. No. 426,227

Claims priority, application Japan, Dec. 19, 1972, 47-127498

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 M **5 Claims**



1. A method of shaping a workpiece by electrical discharge, comprising the steps of:

intermittently impressing a voltage pulse across a working gap formed between a workpiece and an electrode to generate a discharge during a discharge period;

detecting the no-load period between the instant at which the voltage pulse is impressed across the working gap and the instant at which a discharge occurs between the workpiece and the electrode;

detecting the average processing voltage across the working gap; and

varying the discharge period in accordance with the detected no-load period and in accordance with the detected average processing voltage to cause the discharge period to vary directly as the no-load period and to vary inversely as the average processing voltage after the average processing voltage reaches a predetermined level.

2. Apparatus for shaping a workpiece by electrical discharge comprising:

means for intermittently impressing a voltage pulse across a working gap formed between a workpiece and an electrode to generate a discharge during a discharge period;

means for detecting the no-load period between the instant at which the voltage pulse is impressed across the working gap and the instant at which a discharge occurs between the workpiece and the electrode;

means for detecting the average processing voltage across the working gap; and

means for varying the discharge period in accordance with the detected no-load period and in accordance with the detected average processing voltage to cause the discharge period to vary directly as the no-load period and to vary inversely as the average processing voltage after the average processing voltage reaches a predetermined level.

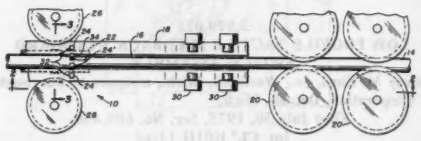
3,999,029
FIN TO TUBE WELDING BY HIGH FREQUENCY CURRENT SOURCE

Malcom Walter Orr, Jr., Signal Mountain, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 9, 1975, Ser. No. 585,416

Int. Cl.² B23K 11/02

U.S. Cl. 219—107 **2 Claims**



1. A method for welding an elongated member to a tube along a line by means of resistance heating caused by a high frequency oscillatory current source, wherein the method comprising the steps of:

a. ovaling said tube by flattening said tube in one direction without altering the thickness of the tube wall;

b. uniformly moving said elongated member and said ovaled tube into close, but not touching adjacent relationship such that said elongated member is adjacent to the flattened side of said ovaled tube;

c. causing said elongated member and said tube to come together at a weld point by rerounding said ovaled tube by increasing the cross-sectional dimension of said ovaled tube in the direction of said elongated member, thereby maintaining a narrow generally V-shaped gap in advance of said weld point, said V-shaped gap terminating at said weld point; and

d. heating said tube and said elongated member in advance of said weld point by applying first and second contacts to said tube and said elongated member respectively at points in advance of said weld point, said first and second contacts each being connected to a high frequency oscillating current source.

3,999,030
WELDING METHOD FOR DISSIMILAR METALS

Takamitsu Nakazaki, Takahagi; Hisanao Kita, Hitachi; Tatsuo Yonezawa, Hitachi, and Hisanori Okamura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

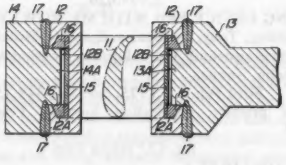
Filed June 14, 1974, Ser. No. 479,502

Claims priority, application Japan, June 18, 1973, 48-67776

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² B23K 15/00

U.S. Cl. 219—121 EM **6 Claims**



1. A method for joining two dissimilar metal members comprising steps of

a. forming a joint surface on a first metal member,

b. preparing a metal plate with a recessed portion, a slot through said metal plate to said recessed portion, and a joint surface for abutting said joint surface of the first metal member, said metal plate being substantially of the same material as that of the first metal member,

c. fitting an end portion of a second metal member through said metal plate into said slot to extend into said recessed portion, said second metal member being of a material dissimilar from that of said first metal member and said metal plate,

d. welding a filler metal into said recessed portion to rigidly join said end portion of said second metal member to said metal plate,

e. abutting the joint surface of said first metal member to the joint surface of said metal plate, and

f. applying electron beam welding only along the interface formed between the abutting joint surfaces of said first metal member and said metal plate, thereby joining the first and second metal members to each other through the metal plate.

3,999,031

METHOD FOR ELECTRON-BEAM WELDING OF DISSIMILAR METALS

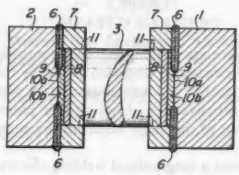
Tatsuo Yonezawa, Hitachi; Takamitsu Nakazaki, Takahagi; Hisanao Kita, and Tomohiko Shida, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 31, 1975, Ser. No. 546,016

Claims priority, application Japan, Feb. 8, 1974, 49-15465

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EM **8 Claims**



1. A method for electron-beam welding of at last first and second metallic members of dissimilar materials comprising the steps of:

providing a metallic plate having at least one opening and composed of a material substantially similar to a first metallic member to be welded:

inserting an end portion of a second metallic member to be welded into at least one opening in the metallic plate and welding closed the opening in the metallic plate with a first weld metal;

overlay welding a padding weld metal on the first weld metal such that the second metallic member is rigidly secured to the metallic plate, the padding weld metal being of a material substantially similar to the first metallic member and having an oxygen content substantially similar to that of the first metallic member;

machining an outer surface of the padding weld metal to form a faying surface thereon;

forming a faying surface on the first metallic member; and

joining the faying surface of the padding weld metal to the faying surface of first metallic member by electron beam welding such that the two faying surfaces are rigidly secured to each other.

3,999,032

CURRENT CONTROL IN AN ELECTRON BEAM WELDER

Rolf Mayer, Stuttgart, Germany, assignor to Institut fur Kerntechnik und Energiewandlug e.V., Stuttgart, Germany

Filed Dec. 15, 1975, Ser. No. 640,448

Claims priority, application Germany, Dec. 20, 1974, 2460424

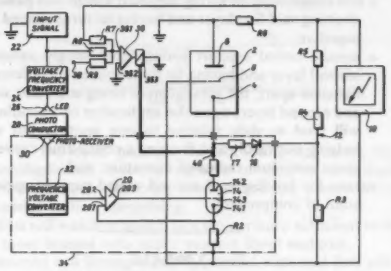
Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EB **12 Claims**

1. In an electric welder including a source of high voltage having first and second output terminals, a voltage divider connected in parallel to said source of high voltage, said voltage divider having a tap, beam furnishing means having an anode connected to said second output terminal and a cathode-control electrode circuit connected from said tap to said first output terminal for furnishing an electron beam having a current varying as a function of the voltage across said cathode-control electrode circuit, apparatus for controlling said current, comprising, in combination:

desired beam current signal furnishing means connected to ground potential for furnishing a desired beam current signal under external control;

controllable impedance means connected in parallel with said cathode-control electrode circuit of said beam furnishing means, said controllable impedance means having



an impedance control electrode for varying the impedance from said voltage divider tap to said first output terminal as a function of an impedance control signal applied to said impedance control electrode;

actual beam current signal furnishing means connected in series with said beam furnishing means for furnishing an actual beam current signal indicative of the actual beam current furnished by said beam furnishing means; and

comparator means interconnected between said actual beam current signal furnishing means, said desired beam current signal furnishing means, and said impedance control electrode for comparing said desired beam current signal to said actual beam current signal and for furnishing said impedance control signal to said impedance control electrode as a function of the difference between the compared signals.

3,999,033

ARC WELDING TORCH HAVING A FLEXIBLE WIRE GUIDE ASSEMBLY

Ralph Hugo Willgohs, Downers Grove, Ill.; Donald Joseph Mikalsen, Carmel, N.Y., and Ralph Bertram Grenville Yeo, Riverside, Conn., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 25, 1975, Ser. No. 552,995

Int. Cl.² B23K *9/00*

U.S. Cl. 219—130 **9 Claims**

1. In a metal inert gas shielded arc welding torch including a torch body through which a consumable electrode is driven, a nozzle assembly having means in electrical contact with said driven electrode and an elongated flexible wire guide assembly of predetermined length extending from said body to said nozzle assembly for controlling the direction of said driven

electrode through said nozzle assembly wherein said flexible wire guide assembly includes a layer composed of electrically conductive strands of flexible solid metal wire helically wound together and forming a passageway, means for securing said electrically conductive layer to said torch body at one end and to said nozzle assembly at the other end thereof and a flexible insulating outer member enclosing said electrically conductive layer; the improvement for enhancing the capability of said flexible wire guide assembly for universal angular and lateral displacement without kinking and flattening in the bent position, said improvement comprising, in combination:

a second layer composed of electrically conductive strands of flexible solid metal wire helically wound together, said second layer being circumferentially arranged in concentric relation around the first layer and in abutting sliding frictional engagement therewith;

a first coiled support spring disposed within said passageway abutting said first layer and having its turns spaced closely together;

a second coiled support spring fitted snugly around said second layer and having its turns spaced a predetermined distance apart, the arrangement being such that said first and second layers upon the application of a bending force will tend to slide relative to one another but without bulging outwardly and forming a continuous curve with a given minimum radius of curvature; and

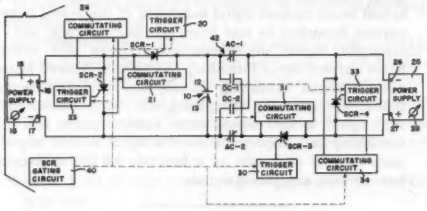
means for holding said second coiled support spring in a state of compression.

3,999,034

SQUARE WAVE WELDING SYSTEM

Ralph E. Barhorst, Troy, Ohio, assignor to Hobart Brothers Company, Troy, Ohio

Filed June 2, 1975, Ser. No. 582,753
Int. Cl.² B23K 9/10
U.S. Cl. 219—131 R **8 Claims**



1. A welding power supply system including

first and second regulated, constant current power supply means each having output terminals for connection to an arc circuit comprising an electrode and a workpiece, each power supply including a current control circuit including.

means for sensing the output current of said power supply,

means for comparing said output current to a reference and for providing a control signal in response to said comparison,

and means for controlling the output current of said power supply in response to said control signal whereby said power supply provides a substantially constant current output under dynamic operating conditions,

series switching means connected between each power supply means and said arc current,

shunt connected switching means connected across the output of each power supply means, and

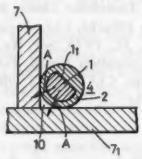
control circuit means connected to control the operation of said series switching means and said shunt switching means for selectively connecting one of said power supplies to said arc circuit and for shunting the output of the other said power supply thereby to maintain a substantially constant and continuous current output from said power supplies for improved current regulation thereof.

3,999,035

LAY DOWN ARC WELDING METHOD

Nobuaki Miyao, Neyagawa; Kunihiro Kosuge, Osaka; Saijiro Yoshida, Toyonaka; Kanaaki Uchiyama, Osaka; Hiroshi Tanimoto, Osaka; Kazunao Mimaki, Amagasaki, and Satoru Goto, Osaka, all of Japan, assignors to Sumitomo Welding Electrode Co. Ltd., Amagasaki, Japan

Continuation of Ser. No. 413,779, Nov. 8, 1973, abandoned, which is a continuation of Ser. No. 287,879, Sept. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 81,482, Oct. 16, 1970, abandoned. This application May 27, 1975, Ser. No. 580,901
Int. Cl.² B23K 9/24, 35/02
U.S. Cl. 219—137 R **5 Claims**



1. The lay down arc welding method comprising the steps of placing two longitudinally disposed generally flat metal pieces to be welded together in contiguous contact with an angle less than 180° therebetween to form at the junction thereof a longitudinal root of the angle adjacent the seam between the two pieces,

disposing about a longitudinal welding electrode metal core wire of a size in the order of fifty square millimeters in cross section a flux layer surrounding at least a portion of said core wire with a part of the flux layer about said wire being thinner than the remainder thicker portion of said flux layer about said wire,

laying down the core wire in said root of said angle with said thinner flux layer adjacent the two pieces and the thicker portion most remote from said seam, and

connecting an arc producing voltage source between said two metal pieces and said core wire thereby to produce a shortened arc length between said electrode and the two metal pieces adjacent said seam with a decreased divergent angle from the wire core to the root of the weld thereby resulting in improved penetration of the metal deposited at said seam from the core wire to produce a weld.

3,999,036

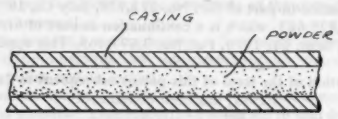
POWDER-CORED STRIP ELECTRODE FOR SURFACING WITH ABRASION-RESISTANT COMPOSITE ALLOYS

Viktor Alexeevich Muratov, prospekt Metallurgov, 23, kv. 28; Valery Vasilievich Chigarev, prospekt Nakhimova, 103, kv. 75; Leonid Solomonovich Malinov, ulitsa Kuprina, 25, kv. 5; Ljudmila Avenirovna Surzhikova, ulitsa 50 let SSSR, 18, kv. 42; Vyacheslav Vasilievich Tarasov, ulitsa Primorskaya, 10, kv. 27; Vladimir Mikhailovich Manov, prospekt Metallurgov, 35, kv. 89; Alexei Afanasievich Kolechko, ulitsa Krasina, 19, and Anatoly Vasilievich Zarechensky, ulitsa Ilicha, 139, kv. 23, all of Zhdanov Donetskoi oblasti, U.S.S.R.

Filed Mar. 7, 1975, Ser. No. 556,314
Int. Cl.² B23K 35/32
U.S. Cl. 219—145 **6 Claims**

1. A powder-cored strip electrode for surfacing with a abrasion-resistant composite alloys, which is made up of a metal

casing filled with a powdered charge, with said metal casing being produced from a metal selected from the group consisting of copper, a copper-base alloy containing nickel, a copper-base alloy containing nickel in combination with aluminum, a



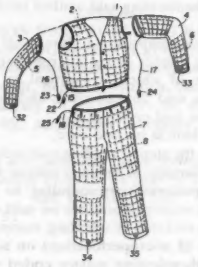
copper-base alloy containing nickel in combination with manganese, a copper-base alloy containing nickel in combination with aluminum and manganese and the powdered charge comprises the following ingredients taken in weight per cent of the total weight of the powder-cored strip electrode:

tungsten carbides	45–70
nickel	0.3–10.5
manganese	0.5–11.0
magnesium	0.2–1.0
aluminum	0.2–1.0
fluorinated polymers	1.5–3.0

3,999,037
HEATED GARMENT

Edward K. Metcalf, Sr., Anchorage, Alaska, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1975, Ser. No. 605,619
Int. Cl.² H05B *1/00*
U.S. Cl. 219—211 **1 Claim**



1. In a heated garment comprising a vest type garment having a lining consisting of an electrical heating element, a pair of sleeves each having a lining consisting of an electrical heating element, a pair of pants having a lining consisting of an electrical heating element, a hat having a lining consisting of an electrical heating element, a pair of socks each having a lining consisting of an electrical heating element and a pair of gloves each having a lining consisting of an electrical heating element, energy means for supplying electrical energy to the electrical heating element of each of the vest type garment, the pair of sleeves, the pair of pants and the hat for energizing said electrical heating elements to provide heat, said energy means comprising a plurality of electrically conductive means each electrically connected to the electrical heating element of a corresponding one of the vest type garment, the pair of sleeves, the pair of pants, the hat, the pair of socks and the pair of gloves, a plurality of electrically connective plugs each connected to a corresponding one of the conductive means for connection to a source of electrical energy and a plurality of electrically connective sockets each connected to the electrical heating element of a corresponding one of the sleeves and legs of the pants for accommodating the plugs of the gloves and socks.

3,999,038
FLARED FUSER ROLL

Malcolm W. Sikes, Jr., Webster; Sudarshan S. Bains, Rochester; Paul D. Norder, Fairport, and Jeffery L. Sisson, Macedon, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 526,768, Nov. 25, 1974, abandoned. This application Aug. 27, 1975, Ser. No. 608,122
Int. Cl.² F27B *9/28*
U.S. Cl. 432—60 **5 Claims**

1. An improved pressure heated fusing apparatus for a copier/duplicator machine capable of simplex and duplex operation wherein the copy sheets make two passes through processing station comprising:

a first roll which is heated to a temperature sufficient to fuse toner images onto paper support sheet material,

a second roll arranged axially parallel with said first roll to define a nip through which the paper support sheet material bearing toner images is passed,

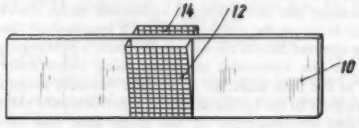
said first roll having a longitudinal cross-sectional shape with a maximum diameter of the ends and a minimum diameter at the center and the difference of the diameters ranging from about 0.008 to about 0.024 inches for a sheet nip length extending from about 11 to about 14 inches,

said first roll being formed with a taper at each end and having a center portion between the tapered ends of substantially uniform diameter.

3,999,039
RESISTANCE HEATED VAPORIZER

Rolf Groth, Witten, Germany, assignor to Flachglas Aktiengesellschaft Delog-Detag, Furth, Germany

Filed Dec. 17, 1974, Ser. No. 533,621
Claims priority, application Germany, Dec. 22, 1973, 2364379
Int. Cl.² C23C *13/12*
U.S. Cl. 219—275 **19 Claims**



1. A resistance-heated vaporizer for vacuum-depositing thin coatings on a flat substantially vertically extending surface, especially for depositing thin metallic coatings on panes of glass or synthetic material, comprising: at least one metal strip having a wide side face and to be placed in spaced relationship to the surface to be coated so that said side face extends parallel to said surface, said strip having end portions to be connected to a source of electricity, and at least one relatively flat pocket provided at said side face, said pocket being electrically conductively connected to said strip and being made of a metallic net-like material and open at the top thereof.

3,999,040
HEATING DEVICE CONTAINING ELECTRICALLY CONDUCTIVE COMPOSITION

Harold (Hal) Ellis, Miami Beach, Fla., assignor to Delphic Research Laboratories, Inc., Miami Beach, Fla.

Division of Ser. No. 438,824, Feb. 1, 1974, Pat. No. 3,923,697. This application July 8, 1975, Ser. No. 594,406
Int. Cl.² H05B 3/16
U.S. Cl. 219—543 12 Claims

1. A device for radiant, conductive or convective heating, said device comprising a dielectric substrate having thereon a layer of substantially uniform thickness and at least two electrodes in contact with said layer for the passage of electric current, said layer comprised of an electrically conductive composition comprising a particulate, homogeneous blend of:

A. about 60 to about 98% by weight of graphite,

B. about 1.5 to about 20% by weight of manganese dioxide, and

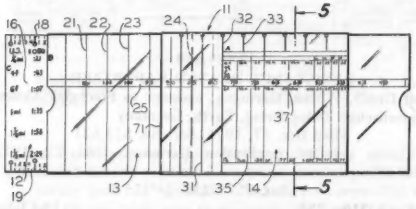
C. about 0.5 to about 20% by weight of zinc oxide,

each of said percentages based on the total weight of said blend

3,999,041
SUMMING CALCULATOR TO ASSIST ANALYSIS OF PAST PERFORMANCE

Joseph Scofield, P.O. Box 5469, Big Bear Lake, Calif. 92315

Filed Jan. 8, 1976, Ser. No. 647,592
Int. Cl.² G06C 3/00; G06G 1/02
U.S. Cl. 235—61 G 6 Claims

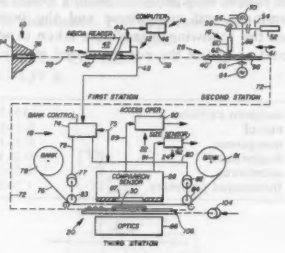


1. A calculator for use in evaluating time and distance information and comprising a composite slide, obverse and reverse faces on the composite slide, a longitudinal time scale on the obverse face of the composite slide, a performing rating index on the composite slide increasing numerically oppositely to the time scale, an inner slide movable longitudinally with respect to the composite slide, a performance rating scale extending longitudinally of the inner slide and increasing numerically oppositely to the time scale, transverse index lines on the inner slide; an outer slide movable longitudinally with respect to the composite and inner slide each of said inner and outer slides being light transmitting such that data and indices from one slide are visible through an overlapping slide; performance rating tables on the outer slide, transverse index lines on the outer slide, and transverse time and distance columns on the obverse face of the composite slide, said time columns increasing in magnitude in accordance with distance increase and increasing by columns longitudinally oppositely to the increase of the performance ratings on the composite slide and the inner slide.

3,999,042
ACCESS CONTROL SYSTEM

Daniel Silverman, 5969 S. Birmingham Ave., Tulsa, Okla. 74105, and Everett A. Johnson, 15 S. Prospect Ave., Park Ridge, Ill. 60068

Continuation-in-part of Ser. No. 272,739, July 18, 1972, Pat. No. 3,829,661, which is a continuation-in-part of Ser. No. 74,066, Sept. 21, 1970, Pat. No. 3,677,465. This application Aug. 8, 1974, Ser. No. 495,632
The portion of the term of this patent subsequent to June 18, 1991, has been disclaimed.
Int. Cl.² G06K 5/00
U.S. Cl. 235—61.7 R 9 Claims



1. In an access control method for selectively controlling access on presentation and authentication of a control card comprising:

1. card means,

2. a unique coded micropattern of microperforations on said card means, and

3. machine readable indicia carried by said card means, said indicia indicative of the specific coded micropattern of microperforations on said card means;

the method of authenticating said control card comprising the steps of:

1. forming a bank comprising a plurality of indexed unique authenticating master coded micropatterns of microperforations, one of which is identical to said coded micropattern on said control card, and corresponding to said indicia on said card;

2. reading said indicia on said card,

3. responsive to the step of reading said indicia selecting the one of said plurality of indexed unique master authenticating micropatterns corresponding to said coded micropattern of microperforations on said card; and

4. responsive to said step of selecting, comparing said coded micropattern of microperforations on said control card with said authenticating master coded micropattern of microperforations selected from said bank.

3,999,043
PULSE WIDTH DETECTION CIRCUIT FOR ELECTRO-OPTICAL LABEL-READING SYSTEM

Charles Reiss, W. Sayville, and Leonard Zuckerman, Dix Hills, both of N.Y., assignors to Servo Corporation of America, Hicksville, N.Y.

Filed June 2, 1975, Ser. No. 582,758
Int. Cl.² G06K 7/14; H04B 1/04
U.S. Cl. 235—61.11 E 2 Claims

1. A circuit for producing an output pulse of predetermined amplitude and a width equal to the mid amplitude width of an input pulse from an input pulse source, said circuit comprising:

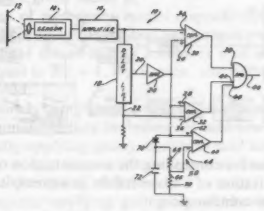
delay line means having an input terminal connected to said input pulse source, a first output terminal and a second output terminal, the output of said delay line at said first output terminal being delayed in time with respect to said input pulse by a first predetermined period and the output

of said delay line at said second output terminal being delayed in time with respect to said input pulse by twice said predetermined period;

amplifier means connected to said delay line first output terminal for doubling the amplitude of the output of said first terminal;

first comparator means having a first input connected to said input pulse source, a second input connected to said amplifier and an output;

second comparator means having a first input connected to said amplifier, a second input connected to said delay line second output terminal and an output;



gate means having a first input connected to said first comparator output and a second input connected to said second comparator output;

a capacitor connected to said amplifier;

a voltage divider subcircuit shunted across said capacitor; and,

a third comparator having a first input connected to said amplifier, a second input connected to said subcircuit, and an output forming an additional input to said gate means.

3,999,044

INSTALLATION FOR PRODUCING RADIOLOGICAL ANGIOGRAPHIC EXPOSURES

Stig Henrik Grim, Osterskar, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

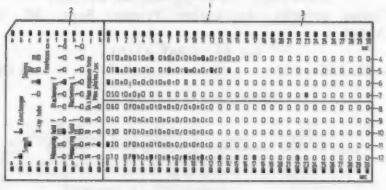
Filed July 25, 1974, Ser. No. 491,650

Claims priority, application Germany, Aug. 30, 1973, 2343796

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.[2] A61N *5/01*

U.S. Cl. 235—151 **9 Claims**



1. In an installation for producing radiological angiographic exposures, a generally longitudinally displaceable patient support; an exposure apparatus; setting means for adjusting said exposure apparatus preceding commencement of a series of exposures; and program control means including a plurality of program cards for control of said installation during a series exposure sequence in dependence upon a particular desired dynamic exposure program, the improvement comprising; each said program card including a portion for recording a static exposure program in addition to effecting control over said installation during the dynamic exposure program so as to determine the setting of said installation preceding said exposures, said program control means including means for reading said static exposure program and for corresponding setting of said installation.

3,999,045

METHOD OF PIGMENTATION CONTROL FOR THERMOPLASTIC FILM

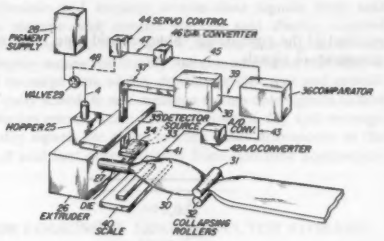
Robert I. Schwartz, Brighton, and Harry R. Sheets, Shortsville, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 444,444, Feb. 21, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,268

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.[2] G01D *21/00*; **G06F** *15/46*

U.S. Cl. 235—151.1 **12 Claims**



10. Apparatus for producing pigmented thermoplastic film at a specific predetermined pigment concentration comprising: a radiation thickness gauge including a circuit producing a signal responsive to a measured film thickness; means for weighing said pigmented thermoplastic film including a circuit producing a signal in response to a measured film weight first; logic circuit means for computing the film thickness from said measured film weight, second logic circuit means for comparing said radiation signal and said second logic circuit means signal; and means responsive to said second logic circuit for adjusting the amount of pigment mixed with said thermoplastic film.

3,999,046

DATA ACQUISITION SYSTEM

John P. Porter, 3028 W. Bailey Road, Cuyahoga Falls, Ohio 44221

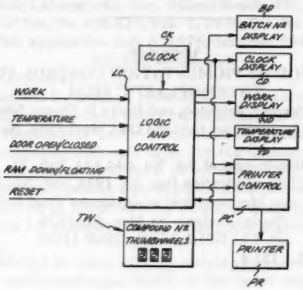
Continuation-in-part of Ser. No. 532,937, Dec. 16, 1974, Pat. No. 3,951,389, which is a continuation of Ser. No. 307,583, Nov. 17, 1972, abandoned. This application Apr. 17, 1975, Ser. No. 569,095

Int. Cl.[2] G06F *15/46*; **B29B** *1/04*

U.S. Cl. 235—151.1 **18 Claims**

1. An apparatus comprising an elastomer processor having means for mechanical working elastomer according to a work cycle, electrically energized drive means for driving said working means such that electrical energy is expended as work is performed on said elastomer, means responsive to the flow of electrical energy to said drive means for providing an electrical signal indicative of the amount of energy consumed by said drive means, means for compensating said signal for the energy consumed by said processor when running without load, means for integrating said compensated signal with respect to time, means responsive to said integrated signal for providing a work signal having a value in accordance with the amount of expended electrical energy as the elastomer is being worked, means for sensing the temperature of the elastomer as it is being worked and providing electrical temperature signal having a value in accordance therewith, means for providing a

time base signal, during the work cycle, having a value representative of time, and means for periodically providing a



readout of the concurrent values of said time base, work and temperature signals.

3,999,047

METHOD AND APPARATUS UTILIZING COLOR ALGEBRA FOR ANALYZING SCENE REGIONS

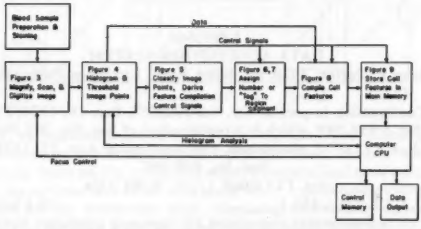
James E. Green, Box 734, Fayetteville, Tenn. 37334

Continuation-in-part of Ser. No. 286,043, Sept. 5, 1972, Pat. No. 3,851,156. This application Nov. 25, 1974, Ser. No. 526,897

The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Int. Cl.² G01N *33/16*

U.S. Cl. 235—151.3 12 Claims


Blood Sample Preparation & Staining
Data
Control Signals
Figure 3 Magnify, Scan, & Digitize Image
Figure 4 Histogram & Threshold Image Points
Figure 5 Classify Image Points, Derive Feature Completion Control Signals
Figure 6,7 Assign Number or "Tag" To Region Segment
Figure 8 Compute Cell Features
Figure 9 Store Cell Features In Main Memory
Histogram Analysis
Focus Control
Computer CPU
Control Memory
Data Output

1. A method of sample analysis comprising the steps

1. illuminating a particle containing sample with light which is modified by the sample;
2. producing a first signal representing a first predetermined wavelength band of the sample modified light at a region in said sample;
3. producing a second signal representing a second predetermined wavelength band of the sample modified light at said region, said first and second wavelength bands being selected to produce a differential contrast between said region and at least one other region in said particle sample; and,
4. algebraically combining with thresholding said first and second signals to classify said sample region in at least one of a predetermined number of categories.

3,999,048

FLOW CONTROL SYSTEM FOR THE PRECIPITATION OF SILVER HALIDE EMULSIONS

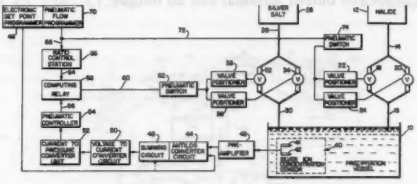
Keith Gordon Parthemore, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 9, 1974, Ser. No. 504,156

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G01N *27/00;* G06G *7/57, 7/58*

U.S. Cl. 235—151.12 2 Claims



1. Apparatus for controlling the concentration of silver ions during precipitation of a silver halide in a precipitation vessel comprising, in combination:

a first valve assembly for introducing silver salt into said precipitation vessel,

a second valve assembly for introducing a halide salt into said precipitation vessel,

a flow programmer for generating a time varying flow control signal for controlling said second valve assembly,

a set point programmer for generating a set point,

a sensor in said precipitation vessel for generating an analog signal representative of silver ion concentration therein,

linearizing means for linearizing said analog signal,

comparator means coupled to said linearizing means and to said set point programmer for generating a first error signal,

ratio means responsive to said flow control signal for modifying said flow control signal by a factor, and

adder means responsive to said first error signal and to said modified flow control signal for providing a second flow control signal for controlling said first valve assembly.

3,999,049

SYNTHESIZER OF MULTIFREQUENCY CODE SIGNALS

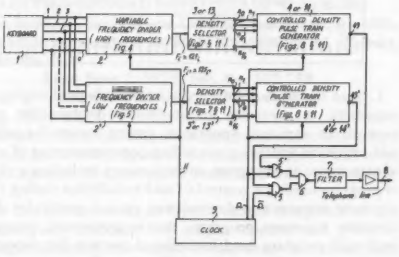
Bernard G. Roche, Pavillon 18, Residence de Bourgogne, Lannion, France (22300), and Jean E. Milon, Kerlerranouet, Perros-Guirec, France (22700)

Filed Sept. 29, 1975, Ser. No. 617,839

Claims priority, application France, Sept. 30, 1974, 74.32909

Int. Cl.² G06F *15/20*

U.S. Cl. 235—152 6 Claims


KEYBOARD
VARIABLE FREQUENCY DIVIDER (HIGH FREQUENCIES) Fig. 4
DENSITY SELECTOR (Figs. 5 & 11)
CONTROLLED DENSITY PULSE TRAIN GENERATOR (Figs. 8 & 14)
FREQUENCY DIVIDER (LOW FREQUENCIES) (Fig. 5)
DENSITY SELECTOR (Figs. 7 & 11)
CONTROLLED DENSITY PULSE TRAIN GENERATOR (Figs. 8 & 14)
FILTER
Telephone line
CLOCK

1. A synthesizer of multifrequency signals formed by a "*m* out of M" code combination of *m* concomitant sinusoidal

component signals, said m component signals having different frequencies, which are selected from a plurality of M predetermined frequencies, said M frequencies all being equal to sub-multiples of a common clock signal frequency, said synthesizer comprising:

a generator of a common clock signal frequency of which said component signal frequencies are each sub-multiples;

selecting means for selecting *m* of said M predetermined frequencies;

a plurality of m controlled division factor frequency divider means for converting said common clock signal into m resultant output signals having frequencies respectively equal to said selected predetermined frequencies multiplied by a given factor p;

a plurality of m scanner means respectively controlled by the output signals from said *m* frequency divider means;

each scanner means having a number n of adjacent terminals equal to $p/2 + 1$, if p is even, and equal to $(p + 1)/2$, if p is odd;

said terminals being given respective addresses;

said terminals further including an address computer for cyclically applying gating signals to said terminals, alternately, in the address increasing directions and in the address decreasing direction;

said computer applying gating signals having a duration equal to the p^{th} part of the period of the resultant output signal which controls said scanner means;

n pulse train generators having recurrence frequencies respectively approximately equal to the values of the amplitude of a sine curve function taken from a tangent to the negative peaks of the sine curve corresponding respectively to *n* values of the argument of said sine function which is equidistributed in the half cycle of said function;

said pulse train generators being respectively activated by said gating signals; and,

means for time-multiplexing the pulses generated by said pulse train generators.

3,999,050

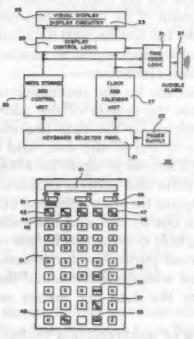
ELECTRONIC DIARY

Satyan G. Pitroda, 1 S. 310 Danby, Villa Park, Ill. 60181

Filed Oct. 10, 1975, Ser. No. 621,636

Int. Cl.² G04C *23/12*; G06F *15/20*; G07C *1/10*

U.S. Cl. 235—152 **21 Claims**



1. An electronic diary circuit comprising in combination: clock-calendar means for generating real time of day and date signals, input selector means for generating as input signals predetermined message time of day and date signals and preselected associated daily schedule and message events data signals, means for visually displaying selected output signals including real time of day and date signals, message time of day and date signals, and daily schedule and message events data signals, message storage and control means having storage means receiving thereto and storing therein said daily schedule and message events data signals incoming from said selector means, and further having control means providing for message entry to and message read-out from said storage means, said data signals being associated with selected message time of day and date signals, respectively, time comparison logic means connected to receive both real time of day and date signals and message time of day and date signals, said comparison means comparing the same and providing first output signals responsive to equal comparisons thereof, respectively, and display control means connected to receive said first output signals from said comparison means, real time of day and date signals from said clock-calendar means, and message time of day and date signals together with associated daily schedule and message events data signals from said message storage and control means, said display control means providing said real time of day and date signals to said visual display means for display thereon when said real time of day and message time of day signals are different and providing said daily schedule and message events data signals to said visual display means when said real time of day and message time of day signals are equal to each other in response to the receipt of said first output signals from said time comparison means.

3,999,051

ERROR LOGGING IN SEMICONDUCTOR STORAGE UNITS

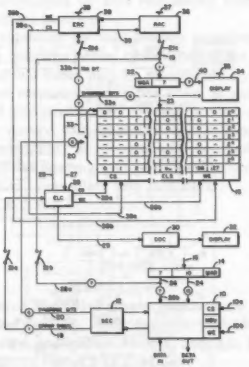
Richard J. Petschauer, Edina, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 486,033, July 5, 1974, Pat. No. 3,906,200. This application Mar. 28, 1975, Ser. No. 563,419

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G06F *11/12*; G11C *29/00*

U.S. Cl. 235—153 AK **5 Claims**



1. In a procedure for scheduling preventative maintenance in a memory system that is configured into a plurality of bit planes and a plurality of bits per bit plane, each bit plane being a replaceable component that is replaced upon the detection of a defective bit therein, the method comprising:

arranging an error logging store to be comprised of a plurality of memory registers;

generating, upon the detection of a defective bit in each bit plane, an error word that is associated with the defective bit plane in which the defective bit is detected, said error word comprising a single tag bit;

testing the bit that is stored in the tag bit position of a memory register that is associated with the defective bit plane with which the generated error word is associated;

storing said generated error word in one of said memory registers of said error logging store only if said test indicates that a defective bit has not been previously detected in the associated one of said bit planes;

generating a defective device count only if said test indicates that a defective bit has not been previously detected in the associated one of said bit planes;

incrementing a defective device counter only upon the generation of each of said defective device counts;

monitoring said defective device counter until said monitored defective device count reaches a predetermined magnitude;

testing the bit that is stored in each of the tag bit positions of each of said memory registers;

reading out the error word that is stored in each of said memory registers only if said test indicates that an error word has been previously stored in the associated one of said memory registers;

monitoring said read out error words;

recording said read out error words and the associated defective bit plane;

providing preventative maintenance of said said memory system by replacing said defective bit planes with non-defective bit planes.

3,999,052

UPPER BOUNDS ADDRESS CHECKING SYSTEM FOR PROVIDING STORAGE PROTECTION FOR A DIGITAL DATA PROCESSOR

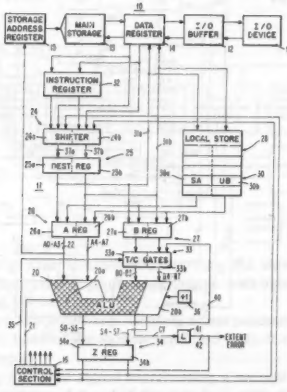
David N. Gooding, Endicott, and Everett M. Shimp, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 18, 1975, Ser. No. 587,936

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] G06F 7/385; G11C 8/00

U.S. Cl. 235—153 AM **10 Claims**



1. A boundary address checking system for checking a storage access request against a boundary address limit and comprising:

parallel binary arithmetic circuitry having independent first and second arithmetic zones;

update circuitry for supplying both the current storage address and a requested storage access length value to the first arithmetic zone for producing a new storage address representing the extent of the storage access request;

and limit checking circuitry for supplying both the boundary limit address and the new address produced by the first arithmetic zone to the second arithmetic zone for producing an indication of whether the new address exceeds the boundary limit address.

3,999,053

INTERFACE FOR CONNECTING A DATA-PROCESSING UNIT TO AN AUTOMATIC DIAGNOSIS SYSTEM

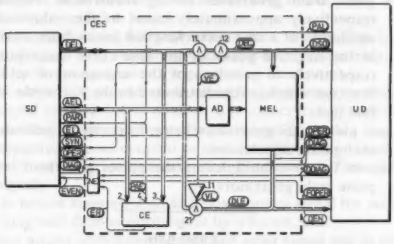
Ginette Laure Dalmasso, Bagnolet, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed Apr. 30, 1975, Ser. No. 573,385

Claims priority, application France, May 8, 1974, 74.15945

Int. Cl.[2] G06F 11/04, 11/10

U.S. Cl. 235—153 A **15 Claims**



1. An interface connected between a data-processing unit and an automatic diagnosis system for enabling the system to diagnose the unit by a succession of operations involving writing data into and reading data out of the unit and by processing the data character-by-character, said interface including a set of lines comprising:

data line means for the bidirectional, character-by-character transmission of the data to be written into or read out of the unit by the system, said data line means comprising a first group of lines equal in number to the bits which form one data character;

address line means for the successive unidirectional transmission from the system of the addresses at which the data transmitted by the data line means is read by the system into or out of the unit, said address line means comprising a second group of lines equal in number to the bits which form one address character; and

control line means for controlling the exchanges of information carried out by the data line means and the address line means, said control line means comprising:

a bidirectional parity line for transmitting parity signals associated with the address and data characters transmitted by the data line means and the address line means,

a sub-group of unidirectional exchange control lines for transmitting from the system signals for controlling the exchanges of information carried out on the data line means, address line means and parity line, and

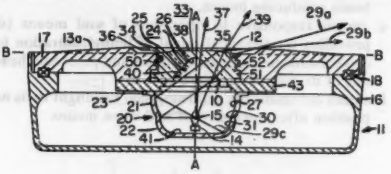
a unidirectional event line for transmitting signals from the unit to report asynchronous events occurring in the unit.

3,999,054

LUMINAIRE AND OPTICAL SYSTEM FOR USE THEREIN

William H. Dorman, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,262
Int. Cl.² B64F 1/20; G08G 5/00
U.S. Cl. 240—1.2 9 Claims



9. A luminaire for airport taxiways and the like comprising,
a housing adapted to be recessed within a taxiway,
said housing having an open portion extending vertically through an upper portion thereof,
a lens securely mounted within said open portion, said lens having an inner surface substantially in the shape of a portion of a cone formed about a central vertical axis,
said cone-shaped surface terminating at its upper extent in a concave surface portion,
said lens having an outer surface including a frustoconical surface portion about said central axis terminating at its upper extent in a planar surface portion normal to said central axis,
a light source proximate said central axis positioned below said lens,
a first specular surface in the shape of a curvilinear surface of revolution about said central axis, positioned below said lens, and terminating at its lower extent at a plane passing through said light source normal to said central axis for reflecting light rays emitted from said light source above said last mentioned plane to the inner conical surface of said lens so that through refraction by said lens said light rays from a shallow uniform equatorial zone of lumination immediately above said housing,
and a second specular surface substantially of spherical shape communicating at its upper extent with the lower extent of said first specular surface for reflecting rays emitted from said light source below said last mentioned plane toward said first specular surface for reflection toward said conical surface in the same manner as those rays emitted above said last mentioned plane to increase the lumination within said shallow uniform equatorial zone.

3,999,055

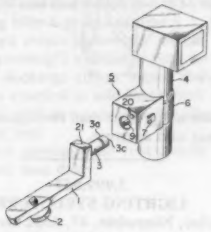
MOUNTING DEVICE FOR MOUNTING A FLASHLIGHT UNIT TO A CAMERA BODY

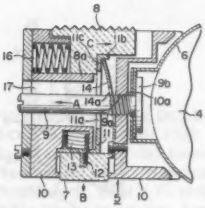
Shigeo Wakahara, Yokohama; Kouichi Takahata, Tokyo, and Toshio Dobashi, Kawasaki, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Sept. 26, 1975, Ser. No. 617,239
Claims priority, application Japan, Oct. 4, 1974, 49-119311[U]; Dec. 25, 1974, 49-156733[U]
Int. Cl.² G03B 15/02
U.S. Cl. 240—1.3 11 Claims

1. In a mounting device having one base secured to a camera body and another base secured to a flashlight unit, for mounting the flashlight unit to the camera body by coupling of said two bases,

one of said two bases comprising:
a. a protrusion;
the other base including:
b. a recess for receiving said protrusion therein;
c. a restraining member for restraining said protrusion in its restraining position and for releasing said protrusion in its non-restraining position;
d. means normally biasing said restraining member to its restraining position;
e. a biasing member biased to retain said restraining member in said nonrestraining position, said biasing member being adapted to release such retention upon coupling





action of said two bases to permit movement of said restraining member to said restraining position;
f. an externally accessible first release member for bringing said restraining member to said nonrestraining position;
g. an externally accessible second release member; and
h. means urging said second release member to a position to prevent movement of said restraining member to said nonrestraining position;
whereby the retention by said biasing member may be released upon coupling action of said two bases and the coupling of said two bases may be maintained by engagement between said restraining member when in said restraining position and said protrusion, and said second release member may be moved to permit said first release member to bring said restraining member to said non-restraining position, thereby disengaging said restraining member from said protrusion and uncoupling said two bases.

3,999,056

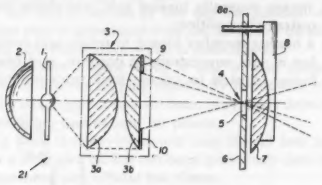
HEADLIGHT

Fritz Faulhaber, CH-6981 Vernate, Switzerland

Filed Jan. 10, 1975, Ser. No. 540,156
Claims priority, application Austria, Jan. 11, 1974. 213/74
Int. Cl.² F21M 3/04
U.S. Cl. 240—41 R 8 Claims

1. A headlight for a vehicle comprising:
a. a housing including an opaque front wall formed with an aperture;
b. an electrically energized light source in said housing having a brightness of at least 5000 stilbs when energized;
c. first optical means for producing a luminous image of said source contiguously adjacent said aperture in said housing; and
d. second optical means offset from said aperture in a direc-

tion away from said light source for presenting said image to a viewer spaced from said housing in said direction as



having a size not greater than two square centimeters and smaller than said aperture,

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3,999,057

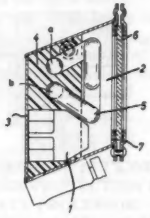
LIGHTING STRUCTURE

Martin Hamacher, Nimrodstr. 47, 4352 Herten, Germany

Filed Mar. 3, 1975, Ser. No. 554,622

Int. Cl.² H05B *33/02*

U.S. Cl. 240—51.11 R **4 Claims**



1. A lighting structure, especially for operational areas having poor reflection, having a casing containing power supply means and a fluorescent tube, said power supply means comprising a constant current transformer with power factor compensation, a rubber-like mass encasing said constant current transformer and the connector terminals of the fluorescent tube such that said mass conceals all live parts of the light fixture with the exception of the light emitting portion of the tube.

3,999,058

MOTOR VEHICLE HEADLAMP SYSTEM

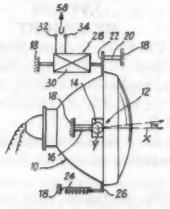
Olivier Puyplat, Paris, France, assignor to Cibie Projecteurs, Bobigny, France

Filed June 25, 1975, Ser. No. 595,009

Claims priority, application France, July 3, 1974, 74.23112

Int. Cl.² B60Q *1/12, 1/06*

U.S. Cl. 240—62 R **11 Claims**



1. A motor vehicle headlight system comprising:

a. main light beam producing means and dipped light beam producing means,

b. said dipped light beam producing means including a headlight having a normal position and mounted for pivotal movement about a non-vertical axis,

c. electrical drive means for pivoting said headlight out of its normal position to slightly raise the dipped light beam emanating therefrom,

d. means for simultaneously extinguishing said main light beam producing means and turning on said dipped light beam producing means,

e. means responsive to operation of said means (d) for providing an electrical signal of limited duration to said drive means to energize the latter and pivot said headlight out of its normal position, and

f. means automatically returning said headlight to its normal position after operation of said drive means.

3,999,059

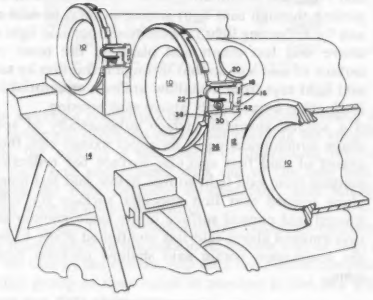
SHOCK ABSORBING HOLD-DOWN LATCH

Earl C. Ricks, and Wiley B. Vickers, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 30, 1975, Ser. No. 573,287

Int. Cl.² B60P *7/12;* **B61D** *45/00;* **B65J** *1/24;* **F16C** *35/02*

U.S. Cl. 248—510 **3 Claims**



1. A bifurcated latch for releasably securing a member against a platform having a longitudinal axis, said latch disposed as a shock absorber against vertical movement and forming a transverse slot which provides limited movement transversely to said longitudinal axis of said platform, comprising:

a. a body having an upstanding bifurcated portion and a pivot arm portion pivotally mounted in substantially normal relation to said bifurcated portion, said bifurcated portion forming a pair of upstanding parallel legs having a slot therebetween;

b. a support member secured to said platform and extending upwardly into said slot between said legs;

c. means pivotally securing said body to said upstanding member; and,

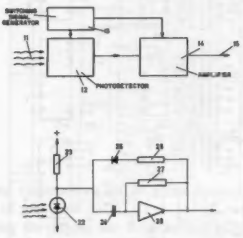
d. means for biased engagement with said member including a U-shaped spring secured to said pivot arm and extending thereunder for the biased engagement with said member, the spring force of said U-shaped spring disposed for limiting the said movement of said member.

3,999,060

DEVICE FOR RECEIVER FOR OPTICAL SIGNALS

Lars-Erik Skagerlund, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Feb. 11, 1975, Ser. No. 549,112
Claims priority, application Sweden, Feb. 18, 1974, 7402085
Int. Cl.² G01J 1/44; H01J 39/12
U.S. Cl. 250—214 R 8 Claims



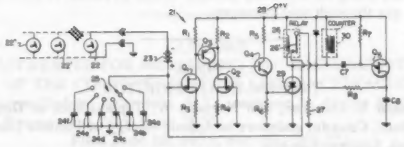
1. In a receiver for optical signals of the type comprising a photosensitive element arranged to pick up comparatively weak optical signals and to convert such optical signals into useful electrical signals, said receiver including an amplifier and associated signal processing members connected to the output of the photosensitive element for processing said useful electrical signals, the improvement wherein said receiver includes additional means for rendering said receiver relatively insensitive to incident radiation of significantly higher levels than the levels of said comparatively weak optical signals thereby to separate said useful electrical signals from undersirable signals produced when said photosensitive element is subjected to direct incident sunlight or other comparatively strong sources of interfering radiation, said improvement comprising a separate signal-responsive device the operation of which is dependent only on the magnitude of the slowly varying high-level signal at the output of said photosensitive element, said signal-responsive device including a switching device operative to switch said amplifier and its associated signal processing members from a higher fixed sensitivity to a lower fixed sensitivity when the magnitude of the electrical signal produced at the output of the photosensitive element exceeds a predetermined value in response to exposure of said photosensitive element to interfering radiation from the sun or other strong source of disturbance.

3,999,061

RADIANT ENERGY INTEGRATING METER

Neil B. McLaughlin, Swift Current, and John R. Allan, Lethbridge, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Apr. 30, 1975, Ser. No. 573,247
Int. Cl.² H01J 39/12
U.S. Cl. 250—214 R 6 Claims



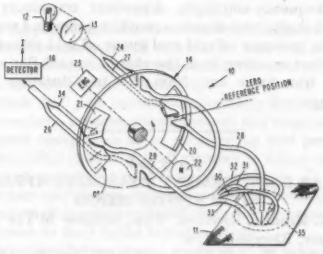
1. A radiant energy integrated meter comprising:
integrating circuit means including capacitor means;
reverse biased radiant energy sensor means connected in series with said capacitor means, said sensor means providing a current which is proportional to impinging radiant energy and which is constant for constant impining radiation thereby linearly charging said capacitor means;
trigger circuit means including a differential amplifier coupled to said integration circuit means for applying a triggering a signal to a first switch means to close said first switch means in response to a predetermined voltage across said capacitor means;
counter means coupled to said first switch means such that the count in the counter means is advanced in response to each closing of said first switch means to maintain a count of the closing over a period of time;
discharge circuit means connected across said capacitor means for providing a discharge path for said capacitor means, said discharge circuit means including a second switch means coupled to said first switch means to close said discharge path in response to the closing of said first switch means; and
delay means for opening said first switch means after a predetermined time delay.

3,999,062

SPECTROPHOTOMETER FOR DUAL MODE FLUORESCENCE ANALYSIS

Herbert M. Demsky, Wappingers Falls; Einar S. Mathisen, Poughkeepsie; Theodore R. Owen, Wappingers Falls, and Alvin H. Tong, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,523
Int. Cl.² G02B 5/14; H01J 5/16, 39/12
U.S. Cl. 250—227 10 Claims



1. In a spectrophotometer for analyzing the fluorescent properties of a test sample, the combination comprising:
a wideband radiant energy source;
a radiant energy detector;
a light pipe system comprising a reference path operative to conduct radiant energy from said source to said detector, and a sample path operative to conduct radiant energy to said detector;
a movable opaque member disposed across said reference and sample paths and having an opening therein for transmitting radiant energy therethrough and a variable interference filter mounted therein for transmitting a variable narrow bandwidth of monochromatic radiant energy;
and means for moving said member relative to said system;
said opening and said filter being movable through positions aligned with said paths to expose said sample and reference paths alternately to monochromatic and polychromatic radiant energy during movement of said member.

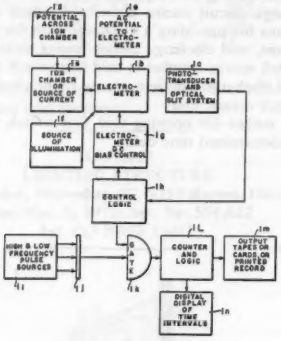
3,999,063
OPTICAL MEASURING SYSTEM WITH DIGITAL ELECTROMETER SCALER

Paul P. Luger, Spokane, Wash., assignor to The Pioneer Educational Society, Portland, Oreg.

Continuation-in-part of Ser. No. 32,578, Aug. 28, 1970, Pat. No. 3,875,410. This application Mar. 27, 1972, Ser. No. 238,574

Int. Cl.² G01D 5/34

U.S. Cl. 250—231 R **15 Claims**


POTENTIAL ACROSS ION CHAMBER
AC POTENTIAL TO ELECTROMETER
ION CHAMBER OR SOURCE OF CURRENT
ELECTROMETER
PHOTOTRANSDUCER AND OPTICAL SLIT SYSTEM
SOURCE OF ILLUMINATION
ELECTROMETER DC BIAS CONTROL
CONTROL LOGIC
HIGH & LOW FREQUENCY PULSE SOURCES
COUNTER AND LOGIC
OUTPUT TAPES OR CARDS OR PRINTED RECORD
DIGITAL DISPLAY OF TIME INTERVALS

1. An optical transducer system consisting of:

a. a source of electromagnetic flux,

b. an object illuminated by said source of flux, said object being an arm in simple harmonic motion,

c. a focusing means, a real image of said object,

d. a mask, opaque to said flux, containing an aperture,

e. said mask, in the focal plane of said focusing means together with said real image so that said aperture and said real image may come into overlapping relationship,

f. a transducer positioned adjacent to said aperture to receive said electromagnetic flux from said aperture,

g. a frequency-amplitude dependent transducer signal, which is also time-duration sensitive generated responsive to the presence of said real image of said object at said aperture resulting from the change in said flux reaching said transducer and from the time-duration of said change.

3,999,064
ANGULAR DISPLACEMENT MEASURING APPARATUS WITH STROBE MEANS

Melvin G. Kramer, Riverton, Wyo., assignor to The Brunton Company, Riverton, Wyo.

Division of Ser. No. 539,820, Jan. 9, 1975, Pat. No. 3,950,859. This application Sept. 15, 1975, Ser. No. 613,104

Int. Cl.² G01D 5/34

U.S. Cl. 250—231 SE **6 Claims**

1. Apparatus for providing digital bytes or characters of output data comprising:

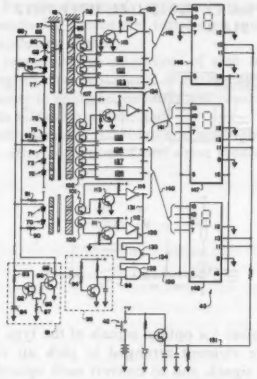
a data source including a pair of tracks and a plurality of additional tracks with each of said tracks being composed of a sequence of cells containing indicia representing digital information with the said cells of respective said tracks being laterally aligned by forming multi-bit characters,

said pair of tracks being arranged so that the indicia contained therein differs for at least a substantial portion around the center of said cells thereof for a given lateral alignment,

one of the indicia for said pair of tracks for a given lateral alignment being substantially centered in the cell thereof with a width less than the width of the said cell containing said one indicia,

a plurality of sensors for detecting the indicia from said tracks including first and second sensors for detecting indicia from respective tracks of said pair and for producing first and second output signals corresponding thereto,

means for producing an enabling signal whenever said first and second output signals differ, and



gating means responsive to said enabling signal for reading multi-bit characters from at least some of said tracks, whereby relative motion between said sensors and said tracks will not result in character reading ambiguities around the lateral boundaries between said cells.

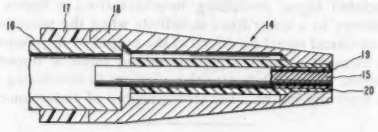
3,999,065
LEAK DETECTION SYSTEM WITH WIRE PROBE

Walton E. Briggs, Lynnfield, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed June 5, 1974, Ser. No. 476,632

Int. Cl.² H01J 39/34

U.S. Cl. 250—281 **8 Claims**



1. In a leak detection system comprising a mass spectrometer tunable to detect the presence of a test gas, and a gas sample inlet member for admitting a limited flow of gas to the inlet of said mass spectrometer, the improvement comprising said inlet member being configured to provide a plurality of restricted passages therethrough, said passages being formed by the interstices between a plurality of individual strands of material held in side by side relation, and the axes of said strands being substantially parallel to the direction of flow of said gas through said passages.

3,999,066
TRITIUM-IN-AIR MONITOR

Richard V. Osborne, and Norman W. Tepley, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

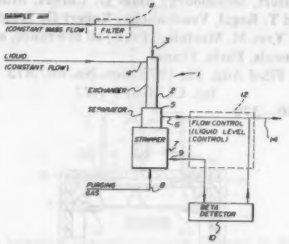
Filed Dec. 11, 1975, Ser. No. 639,641

Int. Cl.² G01T 1/20; G01N 31/00

U.S. Cl. 250—304 **6 Claims**

1. A method for monitoring air for the presence of tritiated water vapor comprising:

a. continuously contacting a predetermined mass flow of an air sample with a predetermined flow of a liquid miscible with tritiated water to transfer the tritiated water vapor from the air sample to the liquid;



b. stripping radioactive noble gases from the liquid with a stream of gas; and

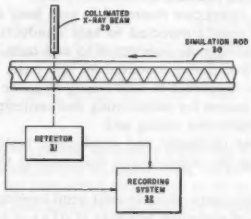
c. analyzing the liquid for beta radiation to determine the presence of tritium.

3,999,067

HIGH SPEED RADIATION SCANNING TECHNIQUE FOR SIMULTANEOUSLY DETERMINING THE PITCH AND ECCENTRICITY OF AN ENCASED OIL

Billy E. Foster, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 14, 1975, Ser. No. 621,892
Int. Cl.² G03C 9/00; G01M 23/00
U.S. Cl. 250—312 **1 Claim**



1. A method of determining any deviation in pitch or any eccentricity of the winding of an encased heating coil unit comprising the steps of longitudinally scanning said encased coil unit by a collimated x-ray beam oriented perpendicular to the axis of said coil unit as said coil unit is moved across said beam, detecting the presence of the coil winding each time it intercepts said beam, and recording said interceptions to provide an indication of any deviation in pitch and/or any eccentricity of said coil winding along its length.

3,999,068

APPARATUS FOR MEASURING THE RADIOACTIVITY OF THE CONTENTS OF TUBE LIKE RECEPTACLES

James Stabile, Scarsdale, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,275
Int. Cl.² G01T 1/00
U.S. Cl. 250—328 **2 Claims**

1. Apparatus for measuring the radioactivity of the contents of a plurality of receptacles comprising, in combination,

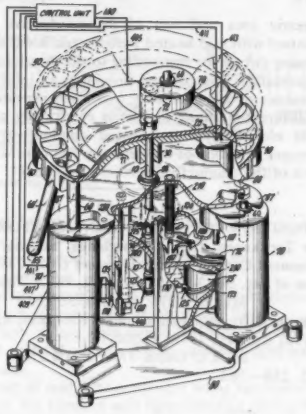
a. horizontally disposed support member having a plurality of peripherally arranged apertures for removeably supporting a plurality of downwardly extending elongated receptacles for containing radioactive material

b. vertically oriented rotatable and reciprocally vertically moveable shaft member engaged to said support member for rotating said support member and for lowering and raising said supporrt member

c. a cam member in engagement with said shaft member to cyclically lower and raise said shaft member and said support member a predetermined distance upon rotation of said cam member

d. a plurality of probes for receiving said elongated receptacles supported by said support member and for measuring the radioactivity thereof said probes being arranged below a selected number of said receptacles in alignment with said selected receptacles

e. a geneva drive means in engagement with said shaft member to incrementally rotate said shaft member and



said support member an amount which aligns receptacles other than said selected receptacles with said probes

f. drive motor means in engagement with said cam means and said geneva drive means to

i. rotate said cam means and cyclically lower said shaft member a predetermined distance and cause said elongated receptacles to be received by said probes and thereafter raise said shaft member to return said elongated receptacles to their initial position

ii. rotate said geneva drive means to incrementally rotate said shaft member and said elongated receptacles upon return to their initial raised position

g. electrical switching means arranged to be actuated upon the lowering of said shaft member said predetermined distance to deenergize said drive motor for a predetermined period after said receptacles have been received by said probes.

3,999,069

PYROELECTRIC TEMPERATURE COMPENSATED SENSING DEVICE EMPLOYING DIFFERENTIAL AMPLIFIER

Allen L. Taylor, Woodbury, and Francis J. McFadden, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

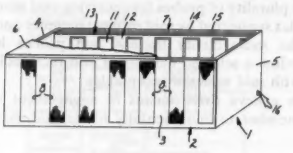
Filed Aug. 8, 1975, Ser. No. 603,176
Int. Cl.² G01J 1/00
U.S. Cl. 250—338 **4 Claims**

1. A temperature compensated sensing device for detecting the presence of a particular condition, which sensor comprises:

first and second conductive layers, at least one of said layers

is formed to provide at least two electrically unconnected conductive portions and the other of said layers is electrically grounded, with said first layer having at least one area that is exposed to and heated by said condition;

a layer of poled, pyroelectric material interposed between and in surface-to-surface contact with said conductive layers and having at least one area that is heated by said heated area of said first conductive layer to result in the development of electrostatic charges on said heated pyro-



electric area and one of the conductive portions in contact with said heated pyroelectric area; and

a sensing circuit for responding to the development of said electrostatic charges and providing an indication of the presence of said condition, which sensing circuit includes a differential amplifier that is electrically connected to said electrically unconnected conductive portions to prevent actuation of the detector when the voltage potentials of the conductive portions are equal.

3,999,070

COMPOSITION FOR USE IN SCINTILLATOR SYSTEMS

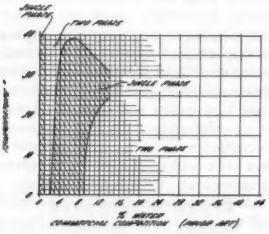
Veikko Tarkkanen, Delft, Netherlands, assignor to Packard Instrument Company, Inc., Downers Grove, Ill.

Division of Ser. No. 349,550, April 9, 1973. This application Mar. 3, 1975, Ser. No. 555,025

Claims priority, application United Kingdom, Apr. 10, 1972, 16499/72; Apr. 10, 1972, 16500/72

Int. Cl.² G09K *1/00;* **F21K** *2/00*

U.S. Cl. 250—362 **1 Claim**



1. A method of effecting liquid scintillation counting whereby chemiluminescence upon the addition of an alkaline material to a liquid scintillation counting composition is reduced, and/or whereby the water miscibility of such composition is enhanced, which comprises effecting such counting with a liquid scintillation counting composition including

a major amount of an aromatic hydrocarbon solvent, a minor amount of an ethoxylated alkyl phenol surfactant, and a scintillation solute, and at least one of:

a. a small amount, effective to reduce chemiluminescence upon the addition of an alkaline material to said composition, of a substituted ethoxylated carboxylic acid wherein said substituent is an alkoxy group of about 5–24 C atoms or an alkyl phenoxy group wherein said alkyl is of about 8–16 atoms, wherein said ethoxy groups are from about 3–12, and wherein said carboxylic acid is the residue of acetic or a propionic acid, and

b. a small amount, effective to enhance the water miscibility of said composition, of a tertiary amine salt of said substituted ethoxylated carboxylic acid or a quaternary ammonium salt of said substituted ethoxylated carboxylic acid.

3,999,071

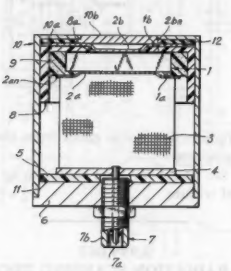
NUCLEAR DETECTORS SENSITIVE TO ALPHA, BETA, AND GAMMA RAYS AND TO THERMAL NEUTRONS AND TO METHODS OF TREATMENT OF CRYSTALS OF SUCH DETECTORS

Paul M. Siffert, Strasbourg; Alain G. Cornet, Mundolsheim; Raymond T. Regal, Vendenheim; Robert G. Triboulet, Meudon, and Yves M. Marfaing, Paris, all of France, assignors to Etat Francais, Paris, France

Filed Aug. 26, 1975, Ser. No. 607,873

Int. Cl.² G01T *1/22*

U.S. Cl. 250—370 **10 Claims**



1. In a nuclear detector sensitive to alpha, beta and gamma rays as well as thermal neutrons comprising;

a semi-conductor crystal having opposite parallel faces,

first and second electrodes disposed on respective parallel faces of said crystal,

a conductive support base for said detector,

an insulating plate on said base,

a conductive plate on said insulating plate,

an elastic contact element mounted between the first of the electrodes and said conductive plate,

a coaxial connector mounted in said base and including a central pole connected to said conductive plate and a surrounding pole connected to said base,

a conductive casing mounted on said base,

a window supported in said casing opposite said crystal,

insulator means for maintaining and centering the crystal in said conductive casing and

seal means of elastic and conductive material interposed between the window and surrounding the second electrode,

the improvement wherein said semi-conductor crystal is a crystal of cadmium telluride (CdTe) of high resistivity.

3,999,072

BEAM-PLASMA TYPE ION SOURCE

Toshinori Takagi, Nagaokakyo, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 23, 1975, Ser. No. 625,040

Claims priority, application Japan, Oct. 23, 1974, 49-123213

Int. Cl.² H01J *7/24, 27/00;* **H05B** *31/26*

U.S. Cl. 250—427 **10 Claims**

1. A beam-plasma type ion source comprising:

a. a first section for generating an electron beam;

b. a second section for ionizing a gas by virtue of electron bombardment caused by the electron beam generated from the first section;

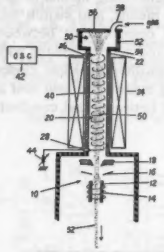
c. a microwave oscillator;

d. a microwave energy transmission circuit disposed in the second section and connected to receive microwave energy from the microwave oscillator in order to cause plasma ionization;

e. a third section for collecting the electron beam; and

f. a gas inlet provided at the third section for introducing

gaseous material to be ionized, whereby an ion beam is extracted through the first section by trapping the ions



into a negative-potential trough formed in the electron beam.

3,999,073

APPARATUS FOR EXAMINING A BODY BY MEANS OF PENETRATING RADIATION

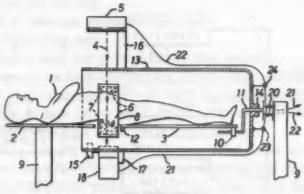
Godfrey Newbold Hounsfield, Newark, and Anthony Michael Williams, Iver, both of England, assignors to EMI Limited, Hayes, England

Filed Dec. 12, 1974, Ser. No. 532,188

Claims priority, application United Kingdom, Dec. 13, 1973, 57715/73

Int. Cl.² G01N 23/02

U.S. Cl. 250—445 T 6 Claims



6. Medical radiographic apparatus including a source of a substantially planar spread of penetrating radiation, an apertured structure for supporting the source so as to project said radiation across said aperture, the aperture being adapted to receive a patient's body, a set of detector devices, also supporting by said support structure, positioned on the opposite side of said aperture to said source to receive radiation projected across said aperture along different paths in said plane and passing through a region of interest in the patient's body, a support for the patient's body and a ring member surrounding said body in the vicinity of said region of interest, flexible radiation attenuator means, said ring member being secured around the body so as to trap the flexible attenuator means between said ring and the body to substantially exclude air from the periphery of the body where it is surrounded by said ring member, two attenuator blocks, disposed to contact said ring member and located between the source and the body and between the body and the detector devices respectively, and supported by said support structure, for the purpose of tending to equalise the amount of radiation incident on the detector devices, despite differences in the lengths of said paths through the patient's body, means for rotating the support structure, and hence the source, the detector devices and the attenuator blocks, about an axis passing through said aperture substantially perpendicularly to the spread of radiation, with the attenuator blocks sliding around said ring member, so as to cause said source to irradiate the body from a plurality of different directions and to obtain output signals, from each said detector devices, relating to the absorption suffered by said radiation on traversing a plurality of different paths through the body in said region of interest during said rotation, orthogonal linear mountings being provided to mount said attenuator blocks to said support structure, and the apparatus thus being adapted to allow for positioning of the patient's body in said aperture with the centre of said ring member offset from the axis of rotation of said support structure.

3,999,074

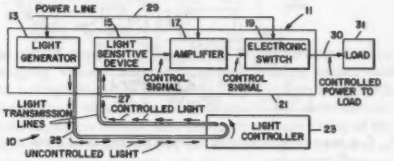
FIBER-OPTIC PHOTOELECTRIC POWER CONTROL DEVICE

James M. Callaghan, Code 333 Philadelphia Naval Shipyard, Philadelphia, Pa. 19112

Filed Aug. 2, 1973, Ser. No. 385,128

Int. Cl.² G02B 27/00; H01J 5/16

U.S. Cl. 250—551 3 Claims



1. A power control system comprising:
a. a power control device;
b. first and second light transmission means;
c. a light controller;
d. said power control device including a light generator, a light sensitive device and an electronic switch;
e. the output of said light generator being applied to the input of said light controller by said first light transmission means;
f. the output of said light controller being operatively connected to the input of said light sensitive device by said second light transmission means;
g. the output control signal of said light sensitive device being operatively connected to one input of said electronic switch;
h. a power line operatively connected to another input of said electronic switch whereby said power output of said electronic switch is controlled as a function of the control signal applied to said one input thereof;
i. said light controller including light controlling means for controlling the light transmitted from said first light transmission means to said second light transmission means;
j. said first and second light transmission means are elongated fiber optic elements;
k. said light controller and light transmission means are remotely positioned from said power control device; and
l. said remotely positioned light controller is placed in an atmosphere that reacts to electrical arcing.

3,999,075

CONTROL SYSTEM FOR AN INTEGRAL SPRING-LOADED PARKING AND SERVICE BRAKE

Phillip R. Johnson, Decatur; Peter F. M. Prillinger, Peoria Heights, and Alfred W. Sieving, Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 18, 1975, Ser. No. 605,583

Int. Cl.² B60T 7/12

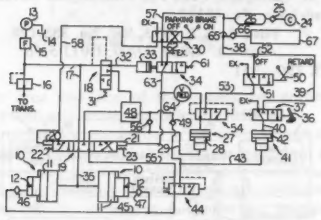
U.S. Cl. 303—63 11 Claims

1. A vehicle braking system comprising:
a. a primary apparatus for producing pressurized fluid,
b. a secondary apparatus for producing pressurized fluid,
c. brake means having a cylinder and a spring-biased piston therein and operable such that introduction of pressur-

ized fluid into said cylinder will oppose the bias of the spring and move the piston to brake-off position and release of pressure from said cylinder will allow said spring to move said piston to brake-on position,

d. conduit means connecting said primary and secondary apparatus to said cylinder,

e. valve means disposed in said conduit means, said valve means having a first fluid flow path therethrough for releasing pressurized fluid from said cylinder, a separate second fluid flow path for admitting pressurized fluid from said primary apparatus to said cylinder, and a third fluid flow path for admitting pressurized fluid from secondary apparatus to said cylinder,



f. a manually operable device having brake-on and brake-off positons,

g. means for actuating said valve means (e) to complete said first flow path therethrough when said manually operable device is in brake-on position,

h. means responsive to the pressure of fluid from said first apparatus and operable when said manually operable device is in brake-off position for

1. actuating said valve means (e) to complete said second flow path therethrough when said pressure is above a predetermined value, and

2. actuating said valve means (e) to complete said third flow path therethrough when said pressure is below a predetermined value.

3,999,076

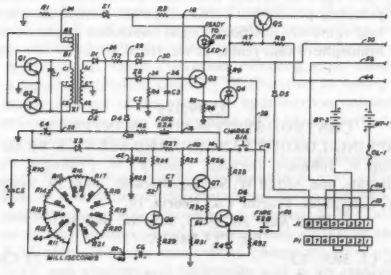
BLASTING MACHINE

James D. Heckelman, Norwalk, Ohio, assignor to Research Energy of Ohio, Inc., Cadiz, Ohio

Division of Ser. No. 435,986, Jan. 23, 1974, Pat. No. 3,959,670, which is a division of Ser. No. 357,826, May 7, 1973, Pat. No. 3,805,115. This application June 2, 1975, Ser. No. 583,105

Int. Cl.[2] H02J *3/14*

U.S. Cl. 307—41 **10 Claims**



1. A sequencing circuit comprising: generating means for generating spaced apart electrical pulses, a plurality of conductors for communicating electrical energy to respective energy receiving elements, first means for energizing a first one of said conductors upon receiving an input signal, second means for energizing a second one of said conductors upon receiving an input signal, third means causing sequential electrical pulses of said generating means to sequentially operate said first and second means, and switch means which in one position provides an open circuit between said generating means and said first and second means while grounding said conductors, and in another position closes said circuit between said generating means and said first and second means and opens the circuit between said conductors and ground.

3,999,077

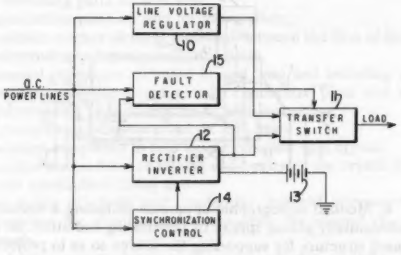
RECTIFIER-INVERTER AND LINE VOLTAGE REGULATOR SYSTEM

Henry S. Borkovitz, Skokie; Christopher P. Nystrom, Chicago, and Robert P. Stirniman, Arlington Heights, all of Ill., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed June 9, 1975, Ser. No. 584,919

Int. Cl.[2] H02J *7/00*

U.S. Cl. 307—66 **2 Claims**



1. A constant voltage, constant frequency, uninterruptible a.c. power supply connected to an a.c. power line, comprising a transfer switch having first and second input terminals and a load terminal, wherein said transfer switch may selectively connect said first and second input terminals to said output load terminals, a line voltage regulator connected to said a.c. power line and supplying a regulated a.c. voltage to the first input terminal of said transfer switch, a rectifier-inverter connected to the a.c. power line, supplying a regulated a.c. voltage to the second input terminal of said transfer switch, said rectifier-inverter having a battery power supply which is utilized during power line faults, a synchronization control system connected to the power line and to the rectifier-inverter for synchronizing the a.c. output signal from said rectifier-inverter with the a.c. power line signal, and a fault detection system connected to said transfer switch for sensing the fault of the power line or the fault of the rectifier-inverter, wherein said transfer switch normally connects said line voltage regulator and said rectifier-inverter to said load terminals, when said fault detection system detects a fault of the power line, said transfer switch disconnects said first terminal from said load terminal and when said fault detection system detects a fault of said rectifier-inverter, said transfer switch disconnects said second terminal from said load terminal.

3,999,078

INTERRUPTION FREE INVERTER POWER SUPPLY

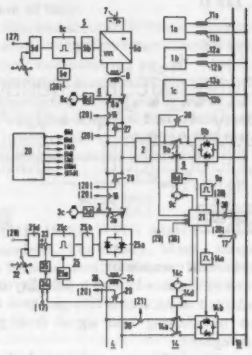
Janos Udvardi-Lakos, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 26, 1975, Ser. No. 617,193

Claims priority, application Germany, Oct. 10, 1974, 2448427; Sept. 27, 1974, 2446248; Sept. 27, 1974, 2446334; July 21, 1975, 2532593; Sept. 8, 1975, 2539900; Sept. 11, 1975, 2540539

Int. Cl.² H02J 7/00

U.S. Cl. 307—66 32 Claims



1. An interruption free current supply system for use with an *a–c* voltage supply network supplying a load comprising:

a. an inverter having:

1. a d.c. storage means;
2. a regulating unit;
3. a drive unit for generating firing pulses;
4. a power section containing controlled rectifiers receiving their d.c. input from said storage means and their firing pulses from said drive unit and providing their output through an inverter transformer;

b. enabling means coupled between said drive unit and the control rectifiers in said power section for blocking the transfer of firing pulses from the drive unit to the controlled rectifiers during normal operation and enabling said firing pulses to reach said controlled rectifiers during emergency power operation;

c. a filter having its output connected to the load;

d. first switching means for coupling the *a–c* voltage supply network to said filter for normal operation;

e. second switching means for coupling the output of said inverter to said filter for emergency power operations; and

f. control means for controlling said enabling means, first and second switching means.

3,999,079

FIRE DETECTOR

Toichi Chikuma, No. 4-11-9-703, Sendagaya, Shibuya, Tokyo, Japan

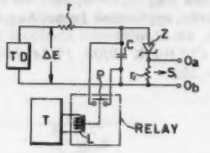
Continuation-in-part of Ser. No. 537,422, Dec. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 381,332, July 20, 1973, abandoned. This application Dec. 17, 1975, Ser. No. 641,579

Claims priority, application Japan, July 27, 1972, 47-74762

Int. Cl.² H01H 37/32

U.S. Cl. 307—117 2 Claims

1. A fire detector comprising transducer means for producing a voltage proportional to a physical quantity of heat or combustion products and for transmitting only the increasing component of said voltage, pulse generator means for generating a train of pulses with a predetermined constant period, capacitor means connected in parallel with said transducer means and supplied with only the said increasing component of said voltage, switching circuit means connected in parallel with said capacitor means and connected to said pulse generator means so that said capacitor means is short-circuited each constant period by switching action of said switching circuit means, the switching action being caused by the train of pulses from said pulse generator means, and constant voltage circuit means connected in parallel with said capacitor means so that a charging voltage appearing thereacross is applied to said



constant circuit means and the latter provides an output when said charging voltage reaches a predetermined value, said constant voltage circuit means being supplied with a sawtooth waveform voltage which falls abruptly due to the short-circuiting of said capacitor means, said sawtooth voltage rising at the same rate of increase as that of the increasing component of said voltage applied to said capacitor during said constant time period and which falls abruptly due to the short-circuiting of said capacitor means after which it again rises at the same rate of increase as that of the increasing component of said voltage during said constant time period.

3,999,080

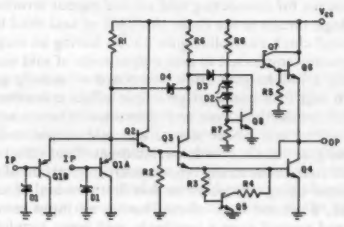
TRANSISTOR COUPLED LOGIC CIRCUIT

Scott Weathersby, Jr., Earl C. Wilson, both of Houston, Tex.; Benjamin J. Sloan, Richardson, Tex. and Robert C. Martin, Dallas, Tex., assinors to Texas Instrument Inc., Dallas, Texas.

Filed Dec. 23, 1974, Ser. No. 535,405

Int. Cl.² H03K 19/08, 19/22, 19/36

U.S. Cl. 307—203 22 Claims



1. A logic circuit comprising at least two first input transistors, a second multi-emitter transistor and a third output transistor, said first transistors being of complementary conductivity type to that of said second and third transistors, circuit means connecting first and second emitters of said second transistor respectively to the collector and the base of said third transistor for permitting said third transistor to conduct only in an unsaturated mode; transistor load circuit means having a fourth transistor whose emitter is connected to the collector of said third transistor; circuit means connecting the collector of the second transistor to said transistor load circuit means; and circuit means connecting the emitters of said first transistors to the base of said second transistor such that when each said first transistor is turned off, said second and third transistors are turned on to provide a first logic

signal level at the collector of said third transistor, and when any said first transistor is in a conductive state, said second and third transistors are turned off and said transistor load circuit means becomes conductive to provide a second logic signal level at the collector of said third transistor.

3,999,081

CLOCK-CONTROLLED GATE CIRCUIT

Toshio Nakajima, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 5, 1975, Ser. No. 602,115

Claims priority, application Japan, Aug. 9, 1974, 49-91302; Oct. 29, 1974, 49-124628

Int. Cl.² H03K *19/08, 19/34, 19/36, 19/40*

U.S. Cl. 307—205 **9 Claims**

1. A circuit comprising a power source having first and second terminals, a first clock-controlled gate circuit having an output node, a capacitor connected to said output node, a precharging circuit including serially connected first and second insulated-gate field effect transistors of a first conductivity type and connected between said first terminal of said power source and said output node, a third insulated-gate field effect transistor of a second conductivity type opposite to said first conductivity type, a source electrode of said third transistor being connected to said second terminal of said power source, a first logic circuit having an input terminal and first and second output terminals, means for connecting said first output terminal of said first logic circuit to said output node, and means for connecting said second output terminal of said first logic circuit to the drain electrode of said third transistor, a second clock-controlled gate circuit having an output node, a capacitor connected to said output node of said second gate circuit, a precharging circit composed of serially connected fourth and fifth insulated-gate field effect transistors of said second conductivity type and connected between said second terminal of said power source and said output node of said second gate circuit, a sixth insulated-gate field effect transistor of said first conductivity type, a source electrode of said sixth transistor being connected to said first terminal of said power source, a second logic circuit having an input terminal and first and second output terminals, said input terminal of said second logic circuit being connected to said output node of said first gate circuit, means for connecting said first output terminal of said second logic circuit to said output node of said second gate circuit, and means for connecting said second output terminal of said second logic circuit to the drain electrode of said sixth transistor, means for applying a first clock signal having a first level at a first, a second and a third period and a second level at a fourth, a fifth and a sixth period, said first lelve being effective to allow an insulated-gate field effect transistor of said first conductivity type to conduct, said second level being effective to allow an insulated-gate field effect transistor of said second conductivity type to conduct to the gate electrodes of said first, third and fifth transistors, means for applying a second clock signal having said first level at said third, fourth, and fifth periods and said second level at said first, second and sixth periods to the gate electrode of said second transistor, and means for applying a third clock signal having said first level at said first, fifth and sixth periods and said second level at said second, third and fourth periods to the gate electrodes of said fourth and sixth transistors.

3,999,082

CHARGE COUPLED AMPLIFIER

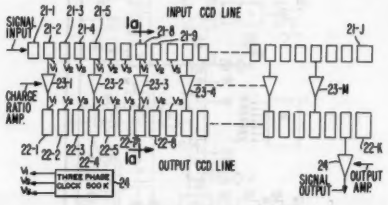
James M. Early, Palo Alto, Calif., assignor to Fairchild Camera and Instrument Corporation, Mt. View, Calif.

Division of Ser. No. 224,045, Feb. 7, 1972, Pat. No. 3,806,772.

This application Feb. 4, 1974, Ser. No. 439,464

Int. Cl.² H01L *29/78;* **H03F** *3/70*

U.S. Cl. 307—221 D **11 Claims**



5. The combination comprising:

a charge transfer register having a plurality of stages, said register adapted to receive a charge signal and including means for transferring said signal from stage-to-stage along said register;

a multiplicity of amplifying means spaced along said register; each amplifying means having an input coupled to a different one of said stages of said register for sensing said charge signal and having an output point for producing thereat an output signal in response to said charge signal;

a common output point; and

means for summing the charge signals produced at the output points of said amplifying means, including charge transfer means coupled between said output points of said amplifying means and said common output point.

3,999,083

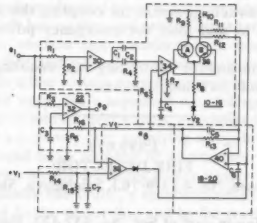
AUTOMATIC THRESHOLD CIRCUIT

Jon H. Bumgardner, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 31, 1975, Ser. No. 563,936

Int. Cl.² H03K *5/20;* **H03B** *3/02*

U.S. Cl. 307—235 J **4 Claims**



1. An electronic circuit having a floating threshold value maintained a preselected number of decibels above the rms frequency weighted noise level in its input, comprising:

receiving and comparing means for receiving an electrical signal input and comparing it with the threshold value of said circuit;

means for providing at least one electrical output descriptive of the percentage of time said input exceeds said threshold;

threshold adjusting means for adjusting the value of said

threshold to a level that is exceeded by said input a predetermined percentage of time regardless of the frequency of the input;

said receiving and comparing means being an electronic comparator having one input coupled to said input to said electronic circuit and another input coupled to the output of said threshold adjusting means;

said threshold adjusting means further including first and second electrical value output providing means providing a first electrical value output when said input exceeds said threshold and a second electrical value output when said input is less than said threshold, for weighting its output as a function of time;

wherein said first and second electrical value output providing means is an electronic limiter coupled to the output of said electronic comparator;

whereby the threshold is automatically adjusted to the level that is a preselected number of decibels above the rms frequency weighted noise level in said input, and

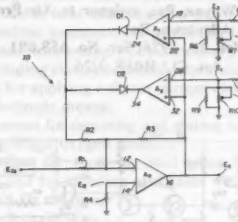
wherein said predetermined percentage of time corresponds to said preselected number of decibels.

3,999,084

LIMITING AMPLIFIER WITH ADJUSTABLE LIMITS

Richard A. Beaudette, Tewksbury, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 24, 1975, Ser. No. 598,610
Int. Cl.² H03K *5/08*
U.S. Cl. 307—237 **1 Claim**



1. A limiting amplifier circuit for generating an output signal which is a function of an input signal so long as the output signal is within a range between an upper limit and a lower limit, comprising:

a. a reference signal source,

b. a first summing amplifier having inputs receiving the input signal and the reference signal and providing the output signal which is a function of the difference between the input signal and the reference signal,

c. a first negative resistive feedback network connected between the input receiving the input signal and an output of the first amplifier to control the gain of the circuit when the output signal is within the upper and lower limits, the gain being established by the ratio of a feedback resistor and an input signal resistor and being substantially equal to one,

d. means for generating an upper limit signal,

e. a second feedback network operatively associated with the first amplifier including a second high gain summing amplifier receiving the output signal and the upper limit signal and providing an output which is the amplified difference between the output and the upper limit signals and a unidirectional current device which conducts current when the output signal exceeds the upper limit signal, the second amplifier having a gain which is large enough to decisively forward bias the device to provide hard limiting,

f. means for generating a lower limit signal,

g. a third feedback network operatively associated with the first amplifier including a third high gain summing amplifier receiving the output signal and the lower limit signal and providing an output which is the amplified difference between the output and lower limits signals and a unidirectional current device which conducts current when the output signal exceeds the lower limit signal, the third amplifier having a gain which is large enough to decisively forward bias the device to provide hard limiting, and

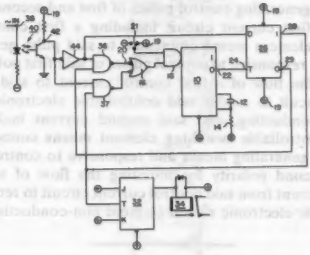
h. a current limiting resistor coupled between a junction of the feedback resistor and the input signal resistor and a junction formed by a connection of the unidirectional current conducting devices for the second and third feedback networks at opposed sides which are opposite to the side coupled to the respective summing amplifiers, the current limit resistor limiting the current from both of the second and third feedback networks.

3,999,085

NOISE REJECTION CIRCUIT

Patrick M. Kelly, Victor, and Stanley L. Russell, West Webster, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed July 14, 1975, Ser. No. 595,552
Int. Cl.² 328 *1/95;* **H03K** *5/18*
U.S. Cl. 307—247 A **2 Claims**



2. A regenerative noise rejection circuit for generating a generally noise-free digital signal in response to a digital input signal that may include several reversals of condition during an initial fractional portion of the normal minimum intended duration of each of its conditions, said circuit comprising:

a. a monostable multivibrator having a time-out period equal to a predetermined fractional portion of the minimum intended duration of each condition of the input signal,

b. means including an invertor and a pair of logic gates for applying input signal to the SET terminal of said multivibrator alternately directly and inversely, the input signal being applied to one of said gates directly and to the other one through said invertor, the outputs of said gates being connected to the SET terminal of said multivibrator, and

c. a flip-flop having an input connected to an output of said multivibrator and its outputs connected separately to inputs of said gates for selectively enabling and inhibiting said gates alternately so that upon time-out of said multivibrator when the input is high the inverse of the input signal is applied to said mutivibrator, and upon time-out when the input signal is low the direct input signal is applied to the multivibrator, an output of the multivibrator constituting a noise-free signal at twice the rate of the input signal, and an output of said flip-flop constituting a noise-free signal at the same rate as the input signal.

3,999,086

DRIVE CIRCUIT FOR A CONTROLLABLE ELECTRONIC SWITCHING ELEMENT, FOR EXAMPLE, A POWER TRANSISTOR

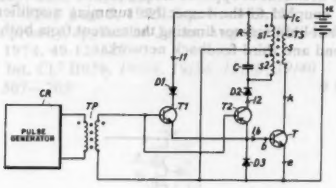
Folke Josef Bertil Ekelund, Norsborg, Sweden, assignor to Telefonaktiebolaget L M Ericsson

Filed Sept. 12, 1974, Ser. No. 505,205

Claims priority, application Sweden, Sept. 21, 1973, 7312892

Int. Cl.² H03K 17/00

U.S. Cl. 307—270 5 Claims



1. A drive circuit for a controllable electronic switch element including a main current circuit and a control current circuit whereby the flow of control current in said control current circuit controls said controllable electronic switch element to govern the flow of current in said main current circuit, said drive circuit comprising a first current circuit, a second current circuit, magnetic feedback means coupling said main current circuit to said first and second current circuits for providing feedback signals from said main current circuit to said first or second current circuits, pulse generating means for generating control pulses of first and second polarities, said first current circuit including a first controllable switching element means connected to said pulse generating means and responsive to control pulses of said first polarity for initiating the flow of a first control current to said control current circuit to render said controllable electronic switch element conducting, and said second current including a second controllable switching element means connected to said pulse generating means and responsive to control pulses of said second polarity for initiating the flow of a second control current from said control current circuit to render said controllable electronic switch element non-conducting.

3,999,087

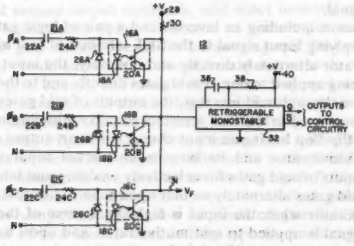
MISSING PHASE DETECTION CIRCUIT FOR USE WITH THREE-PHASE POWER SOURCES

John R. Compton, Riviera Beach, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 15, 1975, Ser. No. 605,139

Int. Cl.² H03K 5/20

U.S. Cl. 307—295 5 Claims



1. Apparatus for monitoring a poly-phase power supply of the type providing a predetermined series of phase voltages of a common frequency, each phase voltage of the series comprising a bipolar alternating voltage, said apparatus comprising:

a. a corresponding series of pulse forming means operatively responsive to said series of phase voltages, respectively, to provide pulsed signals during the excursion of the respective phase voltage waveform in a predetermined one of the power supply polarities;

b. gating means having a corresponding series of inputs for receiving the outputs of said series of pulse forming means, said gating means being operative to produce a first logical output state except during the receipt of the pulsed signal at any of its inputs; and

c. a retriggerable monostable multivibrator having its trigger signal input connected to the output of said gating means, said multivibrator being operative in response to the application of a first logical signal state to its trigger signal input to produce a first logical signal state at its output for a predetermined duration of time greater than the full period of alternation of the individual phase signals to detect the absence of said phase voltages, said multivibrator being retriggerable to renew said predetermined duration of said first logical signal state in response to successive applications of a first logical signal state to its trigger input prior to termination of the first state.

3,999,088

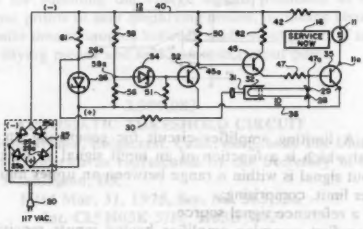
HIGH VOLTAGE AC CONTROL DRIVING LOW VOLTAGE DEVICE TIMED BY COULOMETRIC CELL

John Paul Jones, Wayne, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 13, 1976, Ser. No. 658,091

Int. Cl.² H03K 3/26

U.S. Cl. 307—308 10 Claims



1. A high voltage AC system for driving a low voltage device when it is timed on by a coulometric cell comprising:

a high voltage rectifier for producing a rectified signal from said AC,

comparator means for comparing said rectified signal with a predetermined voltage value for producing low voltage pulses,

said coulometric cell having a cathode electrode and an erodable anode filament disposed in an electrolyte solution,

coulometric timing circuit means coupled to said rectifier for providing current flow between said cathode and said filament thereby to provide electrolytic erosion of said filament when said high voltage AC is applied to said system,

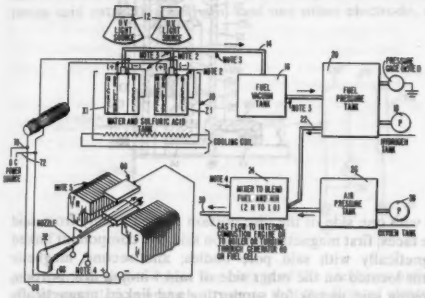
first and second transistors connected as an amplifier pair, said first transistor coupled to said comparator whereby said amplifier pair is adapted to drive said low voltage device in response to said low voltage pulses, and

said coulometric cell coupled to said amplifier pair for preventing said amplifier from driving said low voltage device until said filament opens due to electrolytic erosion.

3,999,089
NON-POLLUTANT FUEL GENERATOR AND FUEL BURNER WITH A NON-POLLUTANT EXHAUST AND SUPPLEMENTARY D.C. GENERATOR

Maurice Jay Barros, 541 Westwood Drive, Dover, Del. 19901

Filed Mar. 1, 1974, Ser. No. 447,352
Int. Cl.² H02N 4/02
U.S. Cl. 310—11 3 Claims



1. A non-polluting fuel generator and fuel burner with a non-polluting exhaust and supplemental DC generator for producing usable heat and electrical power, comprising:

an electrolytic generator for producing hydrogen and oxygen gases from a supply of water, said electrolytic generator including electrode means immersed in the water, and means for applying a direct current electrical potential to said electrode means;

storage means for receiving and storing under pressure said hydrogen and oxygen gases;

mixer means for receiving said gases from said storage means and for blending said gases with air to produce a fuel and air mixture;

a burning nozzle;

means for feeding said fuel and air mixture under pressure to said nozzle, said mixture exiting said nozzle in a stream;

electrical arc means for igniting said fuel mixture stream to produce a hot, ionized stream of combustion products;

heating core means for receiving said combustion products and for heating water to produce steam usable in the production of mechaical power; and

magnetohydrodynamic means interposed in said stream of hot ionized combustion products for the generation of direct current electrical power, said combustion products being non-polluting.

3,999,090
STEPPER MOTOR

Richard C. Sinnott, Menlo Park, Calif., assignor to CRS, Berkeley, Calif.

Filed Sept. 30, 1975, Ser. No. 618,028
Int. Cl.² H02K 37/00
U.S. Cl. 310—49 R 2 Claims

1. A unidirectional step by step motor adpated to step between successive stable rest positions in response to successive electrical pulses of opposite polarity, comprising:

a rotor having a high permeability, the rotor including a central hub portion and a plurality of annularly aligned similar blade portions spaced around and extending from the hub portion;

means mounting the rotor for rotation about a central axis of rotation whereby, upon rotation, the loci of one side of the blades define an annular surface of revolution about said axis;

an energizing coil for generating magnetic flux responsive to the application of electrical pulses;

means defining a core of high magnetic permeability which passes through the center of said coil and has first and second spaced apart opposite polarity poles disposed about said axis and proximate to the rotor for concentrating the coil flux and passing coil flux through the rotor;

the first pole of said core having a surface thereon disposed in opposed, proximately spaced and parallel relationship with the rotor hub portion so as to form a gap therebetween of minimum magnetic reluctance;

the second pole of said core having a surface thereon disposed in opposed, proximately spaced and parallel relationship with said annular surface of revolution defined by the loci of the blades;

means defining an annular array of similar permanent magnets each having opposite parallel pole faces respectively disposed on opposite sides of the annular array and each being magnetized in the direction normal to its pole faces, said magnets being arranged with adjacent magnets in the annular array having opposite polarity;

said annular array of similar permanent magnets being disposed on said surface of the second pole of the core in serial intervention in the coil flux path between said

second pole and the rotor blades, with the magnet pole faces on one side thereof being in engagement with said surface of the second pole of the core, and with the magnet pole faces on the opposite side thereof being exposed and disposed in opposed, proximately spaced and parallel relationship with said annular surface of revolution so as to form a spacing of minimum magnetic reluctance between the exposed magnet pole faces and the rotor blades;

the rotor blades having roots and tips, and having leading and trailing edges relative to the designed direction of rotation, all of which generally define the size, shape and spacing of the blades as measured parallel to said surface of revolution;

said plurality of rotor blades being sized and spaced circumferentially relative to the exposed magnet pole faces to produce successive stable rest positions for the rotor

wherein each blade partially overlaps a different pair of exposed adjacent magnet pole faces and provides a primary magnetic flux path therebetween, with said overlapped pairs of adjacent pole faces having the same polarity sequence in the direction of rotation around the annular array, which polarity sequence reverses at each successive rest position; and,

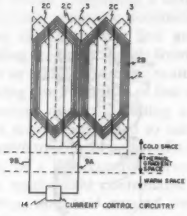
the rotor blades and magnet pole faces being of dissimilar shape selected to produce substantially in excess of half the angle rotation of the rotor between successive stable rest positions responsive to the application to the coil of electrical current of a polarity which enhances the field of the magnets overlapped by the leading edges of the blades, and to oppose such rotation in the opposite direction upon the application to the coil of electrical current of a polarity which enhances the field of the magnets overlapped by the trailing edges of the blades.

3,999,091

SUPERCONDUCTING MACHINE HAVING WOUND DAMPER-SHIELD WINDING

James L. Kirtley, Jr., Brookline, and Joseph L. Smith, Jr., Concord, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 13, 1974, Ser. No. 523,604
Int. Cl.² H02K *9/00*
U.S. Cl. 310—52 **16 Claims**



1. A superconducting machine having, in combination, a rotor with a superconducting field winding;

a stator with a normally conducting polyphase armature;

a wound damper-shield winding disposed between the superconducting field winding and the normally conducting armature, said damper-shield winding being disposed in the cold region of the machine and having current conducting leads to a warm region; and

electric current control means at the warm region connected to said leads and adapted to pass current in response to voltages that appear between said leads.

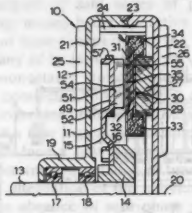
3,999,092

PERMANENT MAGNET SYNCHRONOUS DYNAMOELECTRIC MACHINE

Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Mar. 10, 1975, Ser. No. 556,995
Claims priority, application Canada, Apr. 4, 1974, 196860
Int. Cl.² H02K *21/12*
U.S. Cl. 310—156 **11 Claims**

1. An axial gap synchronous dynamoelectric machine comprising a pair of structural components supported for relative rotation on a common axis; a plurality of permanent magnet pole bodies on one component oriented magnetic in an axial direction, said pole bodies being spaced apart in an annular array on an axis coinciding with said common axis and said bodies having alternate north and south polarity pole faces lying in an annular surface; an annular array of overlapping coils bonded together by means of a bonding medium to form a unitary discoidal winding structure having an annular disc portion containing the coil sides and inner and outer ring portions containing the coil end-heads, each one of said coils having its sides generally radial and at a coil span of approximately one pole pitch, and said coils being interconnected as an alternating current winding; means for supporting said winding structure on the other structural component with the axis of the winding structure coinciding with said common axis



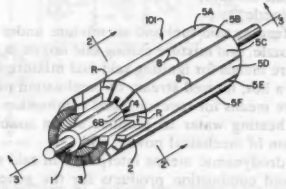
and with one side of the disc portion spaced axially from said pole faces; first magnetic means on said one component linked magnetically with said pole bodies; and second magnetic means located on the other side of said winding disc portion, engaging said means for supporting and linked magnetically with the winding structure, said first and second magnetic means providing flux paths for the pole bodies and the winding.

3,999,093

ROTATING ELECTRIC MACHINE HAVING A CONTROLLED GRADIENT WINDING AND A CIRCUMFERENTIALLY SEGMENTED MAGNETIC CORE ARMATURE

James L. Kirtley, Jr., Brookline, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed June 21, 1973, Ser. No. 372,130
Int. Cl.² H02K *19/00*
U.S. Cl. 310—198 **12 Claims**



1. A rotating electric machine that comprises, in combination, rotatable field means, and an armature having a controlled gradient a-c winding and containing a high permeability magnetic material subdivided in the circumferential direction into a plurality of segments, each segment being electrically insulated circumferentially from all other segments.

3,999,094

CATHODOLUMINESCENT GAS DISCHARGE DEVICE WITH IMPROVED MODULATION CHARACTERISTICS

Gerald Joseph Chodil, Highland Park, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

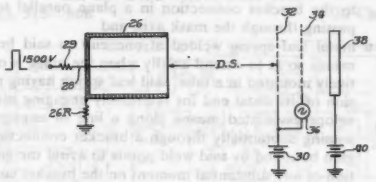
Filed June 27, 1975, Ser. No. 591,192
Int. Cl.² H01J *17/04*
U.S. Cl. 313—192 **11 Claims**

1. For use in a gas discharge system in which electrons are extracted from a gas discharge and accelerated toward a designated target anode, the combination comprising, in the following sequential ordered arrangement:

means including a cathode electrode for generating a gas discharge for use as a source of electrons;

an electron-transmissive extraction grid electrode spaced from said cathode electrode and receiving an electrical potential for extracting electrons from the gas discharge;

an electron-transmissive modulation grid electrode spaced from and aligned with said extraction grid electrode and adapted to receive a control voltage for modulating the flow of electrons through itself, the spacing between the extraction grid electrode and one of said other electrodes being selected such that a drift space having a length approximately equivalent to at least one ionization mean free path is located between said extraction grid and said one other electrode, said



drift space acting to lower the energy of the electrons arriving at said modulation grid electrode so that the flow of electrons therethrough can be modulated by a smaller amplitude control voltage than is possible without the drift space; and

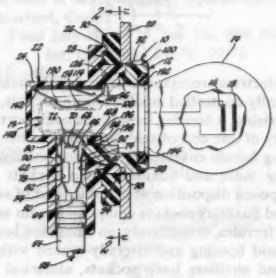
a target anode spaced from said modulation grid and receiving an accelerating potential for accelerating toward itself those electrons which pass through the modulation grid electrode, the spacing between the target anode and the modulation grid electrode being too small, at the gas pressure within the system, to sustain a gas discharge therebetween.

3,999,095

LAMP SOCKET AND BULB ASSEMBLY WITH SIDE CONTACTS

Warren Pearce, Jr., Warren, and Charles W. Ramsey, Niles, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 6, 1975, Ser. No. 619,786
Int. Cl.² H01J *5/48, 5/50*
U.S. Cl. 313—318 **6 Claims**



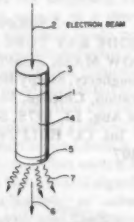
1. A combination lamp socket and base assembly for use with a lamp having a bulb with a filament therein requiring alignment in a precise relationship to optical components of a lamp assembly comprising: a bulb base of polyhedron cross-section including a plurality of axially spaced parallel reference surfaces on one side of said base to define a three point reference platform thereon, a reference stop surface on said base formed transversely of said parallel surfaces, a pair of electrical contacts supported exteriorly of said base extending axially thereof, each contact being electrically connected to the bulb filament for supplying power thereacross, a lamp socket having means thereon for removably securing said socket to a panel at a socket opening therein, wall means in said socket defining a bulb base opening for axial insertion of said lamp base into said lamp socket, said wall means including a side wall surface having a first portion extending axially of and in parallelism to the longitudinal axis of said bulb base opening, said side wall surface including a second portion defining an insert stop surface engaged with said reference stop surface to limit axial insertion of said bulb base into said recess, said plurality of parallel reference surfaces located in juxtaposed alignment with said side wall surface to position the bulb filament along a first axis, said reference stop surface being in juxtaposed relationship with said second portion of said side wall surface to position the bulb filament along a second axis, a first electrical contact terminal including an axially extending support secured to said wall means, a curvilinear contact segment on said first contact terminal formed reversely of said support and disposed within said bulb base opening to engage the bulb base to apply a first resultant axial force thereon to pull said bulb base axially inwardly of said bulb base opening to stabilize the bulb filament along the first axis and to electrically mate with one contact of said pair of electrical contacts on said bulb base, a pressure spring on said first electrical contact terminal extending inwardly of said bulb base opening to engage another side of said bulb base to produce a second resultant force thereon generally transversely of said bulb base to bias the three point reference platform thereon into engagement with said side wall surface to stabilize the bulb filament along the second axis, and a second electrical contact terminal supported within said wall means including a contact segment thereon biased toward said bulb base into electrical contact with the other one of said pair of electrical contacts on said bulb base.

3,999,096

LAYERED, MULTI-ELEMENT ELECTRON-BREMSSTRAHLUNG PHOTON CONVERTER TARGET

L. Warren Funk, and Stanley O. Schriber, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 3, 1975, Ser. No. 554,564
Claims priority, application Canada, Dec. 12, 1974, 216311
Int. Cl.² H01J *35/08*
U.S. Cl. 313—330 **9 Claims**



1. A target for converting the kinetic energy of a beam of electrons into bremsstrahlung radiation primarily in the beam forward direction comprising:

a first layer of material upon which the electron beam is to be directed, said first layer consisting of a high Z material having an atomic number Z greater than 58 or a medium Z material having an atomic number Z greater than 25 and less than 58, for converting said electron energy to bremsstrahlung radiation;

a second layer of material positioned in the beam forward direction with respect to said first layer, said second layer consisting of a low Z material having an atomic number Z less than 25, for stopping electrons transmitted through said first layer; and

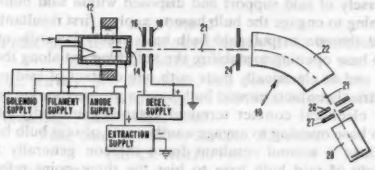
a third layer of material positioned in the beam forward direction with respect to said second layer, said third layer consisting of a high Z material for absorbing low energy photons in the bremsstrahlung radiation.

3,999,097

ION IMPLANTATION APPARATUS UTILIZING MULTIPLE APERTURE SOURCE PLATE AND SINGLE APERTURE ACCEL-DECEL SYSTEM

Wen Chuang Ko, Wappingers Falls; Albert Schien, Carmel, and James Robert Winnard, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 592,149
Int. Cl.² H05H 7/06; H01J 21/50
U.S. Cl. 313—361 5 Claims



1. An ion implantation apparatus for providing a group of discrete ion beams which may be used to simultaneously impinge upon a corresponding plurality of discrete chip areas located upon a target wafer comprising;

an ion source,

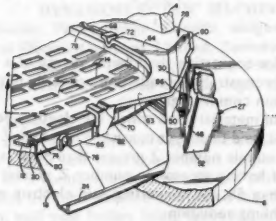
a multiple-apertured source electrode of concave profile arranged at the extraction side of said source, single-apertured extraction electrode means associated with said source electrode and single-apertured deceleration electrode means associated with said extraction electrode means for extracting a plurality of discrete ion beams from said source through said apertures, said ion beams being oriented in a relatively parallel direction along a beam path, and deflection magnet means associated with said beam path for deflecting said plurality of ion beams without destroying the discrete nature of the beams to focus said beams upon a corresponding plurality of microelectronic chips arranged upon a target wafer.

3,999,098

COLOR CATHODE RAY TUBE HAVING AN IMPROVED SHADOW MASK SUSPENSION SYSTEM

Lawrence W. Dougherty, Sleepy Hollow, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Aug. 12, 1975, Ser. No. 603,975
Int. Cl.² H01J 29/07, 29/02
U.S. Cl. 313—407 12 Claims



1. For use in a rectangular-type color cathode ray tube, a system for suspending an approximately rectangular shadow mask on the envelope of the tube at a predetermined spacing from a screenbearing faceplate portion of the envelope, including four mask suspension devices spaced around the mask, one at each corner thereof, at least three of said devices comprising:

envelope-associated means on the inside of the envelope in a corner thereof; and

mask-mounted means for retentively engaging said envelope-associated means, comprising:

metal bracket means disposed on a corner of the mask and welded to the mask on at least three points, two points being located one each on adjoining sides of the mask corner to impart tangential rigidity to the bracket connection, a third point being located spaced from a line connecting said two points so as to impart rigidity to the bracket connection in a plane parallel to and passing through the mask axis, and

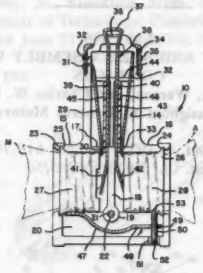
a metal leaf spring welded at one end to said bracket means so as to extend axially when the mask is operatively mounted in a tube, said leaf spring having provision on its distal end for retentively engaging said envelope-associated means along a line of engagement passing subtantially through a bracket connection region bounded by said weld points to avoid the generation of any substantial moment on the bracket connection.

3,999,099

ELECTRICAL RECEPTACLE DEVICE WITH MAIN LAMP AND THERMOSTATICALLY-CONTROLLED AUXILIARY LAMP SOCKETS

Henry Herion, 216 Sutherland St., City Island, N.Y. 10464

Filed Apr. 12, 1976, Ser. No. 676,101
Int. Cl.² H05B 39/10, 41/46
U.S. Cl. 315—93 6 Claims



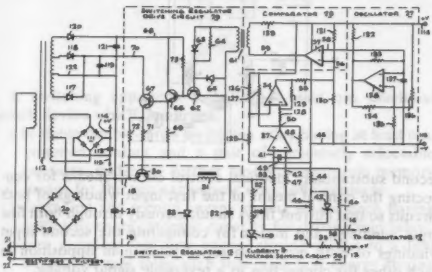
1. In an electrical receptacle device with main lamp and thermostatically-controlled auxiliary lamp sockets, the combination comprising, a housing member, a neck portion extending outwardly of one end of said housing member, a cylindrical screw plug ferrule enveloping said neck portion, said housing enclosing main and auxiliary lamp sockets in aligned, mutually-opposed disposition at the other end of said housing, said main and auxiliary sockets comprising main and auxiliary lamp socket ferrules, respectively, an elongated heating chamber within said housing and laterally-spaced with respect to said main and auxiliary lamp sockets, electrical conducting means interconnecting said screw plug ferrule and said main lamp socket ferrule, electrical circuit means interconnecting said main lamp socket ferrule and an auxiliary lamp in said auxiliary lamp socket, said electrical circuit means comprising heat responsive switch means in said heating chamber operative to open circuit in response to heat generated in said chamber by an energized lamp in said main lamp socket, said heat responsive switch means comprising an elongated bi-metallic element having one end fixed to said main lamp socket ferrule and the other end moveable, selectively in the direction towards and the direction away from said auxiliary lamp

socket ferrule, and means for adjusting the positioning of said heat reponsive switch means with respect to said auxiliary lamp socket ferrule.

3,999,100
LAMP POWER SUPPLY USING A SWITCHING REGULATOR AND COMMUTATOR

King Hubert Dendy, Panorama City, and Morton B. Leskin, Sherman Oaks, both of Calif., assignors to Morton B. Leskin, Sherman Oaks, Calif.

Filed May 19, 1975, Ser. No. 578,490
Int. Cl.² H05B 41/36; G05F 1/08
U.S. Cl. 315—308 **20 Claims**



1. A power supply adapted for use with a metal halide or like ac lamp, comprising:

a source of unregulated dc power,

a dc regulator connected to regulate the dc power from said source,

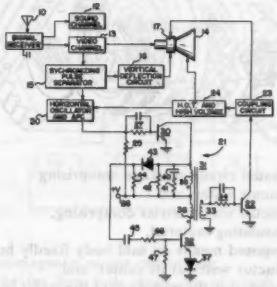
a commutator connected to receive the regulated dc power from said regulator and to supply said power with alternating polarity to said lamp, and

feedback circuit means for sensing the dc current and voltage drawn by said lamp via said commutator, and for controlling said dc regulator in response to said sensed current and voltage so that substantially constant power is supplied to said lamp.

3,999,101
HORIZONTAL DEFLECTION SYSTEM

Martin Fischman, Seneca Falls, and Jesse H. L'Hommedieu, Waterloo, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 30, 1975, Ser. No. 600,404
Int. Cl.² H01J 29/70, 29/76
U.S. Cl. 315—408 **12 Claims**



1. A driver circuit for a horizontal deflection system in a television receiver having a horizontal oscillator and a horizontal output transistor comprising:

a transformer having an output winding connected to said horizontal output transistor and first and second input windings;

a driver transistor having an input electrode connected to said oscillator and an output electrode connected to said first input winding for providing a trace drive signal to said horizontal output transistor;

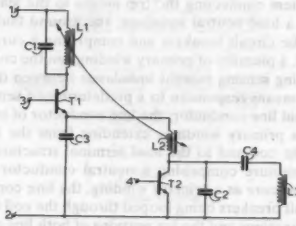
a semiconductor switch having an output electrode connected to said second input winding for providing a retrace drive signal to said horizontal output transistor; and

pulse forming means connected to said transformer and to an input electrode of said semiconductor switch for providing a pulse to said semiconductor switch in response to termination of said trace drive signal by said driver transistor for causing said semiconductor switch to provide said retrace drive signal.

3,999,102
LINE DEFLECTION CIRCUIT ARRANGEMENT

Derek James Gent, Carshalton, and Dennis Charles Frederick Skelton, Wallington, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,414
Claims priority, application United Kingdom, Apr. 1, 1974, 14380/74
Int. Cl.² H01J 29/74
U.S. Cl. 315—410 **22 Claims**



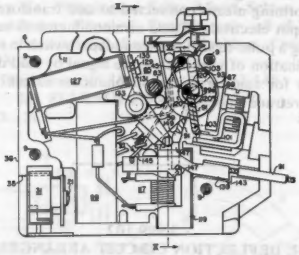
1. A circuit arrangement for supplying current to a line deflection coil from a first source of a direct voltage, said arrangement comprising a switched mode power supply circuit including a first switch, a first inductor coupled in series with said first switch, said switch and inductor being coupled between terminals adapted to be connected to said first source of direct voltage, and a line deflection circuit coupled to said power supply circuit and comprising a second switch, a second inductor series coupled to said second switch, and a capacitor coupled to said first switch, said first switch having a control input means for receiving a first control signal having a television line frequency or a multiple or submultiple thereof whereby charge is produced on said capacitor, said capacitor when charged comprising a second direct voltage supply for said second switch, means for ensuring that during each period when said first switch is non-conducting the voltage at the junction of said first switch and said first inductor has a half sinewave shape at a first frequency comprising said first inductor being tuned to a selected frequency, said second switch having input means for receiving a second control signal having a line frequency whereby current is provided to said line deflection coil during scan periods and to be non-conducting during the flyback periods, and means for ensuring that during each period when said second switch is non-conducting the voltage at the junction of said second switch and said second inductor has a half sinewave shape at a second frequency comprising said second inductor being tuned to a selected frequency.

3,999,103

MULTI-POLE GROUND FAULT CIRCUIT BREAKER

John J. Misencik, Shelton, and Kenneth R. Coley, Fairfield, both of Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 14, 1975, Ser. No. 558,564
Int. Cl.[2] H02H 3/28
U.S. Cl. 317—18 D 7 Claims



1. A ground fault circuit interrupter for use in a load center and comprising at least two circuit breakers, a ground-fault detector, each circuit breaker comprising a pair of cooperable contacts operable between open and closed positions, an operating mechanism for operating the contacts and comprising a latchable pivotally supported trip member, trip means for latching the trip member, a load terminal structure, a line terminal structure, a line conductor of an AC electrical distribution system connecting the trip means to the load terminal structure, a load neutral structure; the ground-fault detector between the circuit breakers and comprising a current monitoring coil, a plurality of primary windings on the coil, a secondary winding sensing current imbalance between the primary windings, means responsive to a predetermined sensing signal to open said line conductor; the line conductor of each circuit breaker as primary windings extending from the trip means through the coil and to the load terminal structure, the load neutral structure comprising a neutral conductor extending through the core as a primary winding, the line conductors of both circuit breakers being looped through the coil in opposite current directions and the leg portions of both line conductors being located adjacent to the coil at substantially 180° from the location of the leg portion of the load neutral conductor adjacent to the coil, and the means responsive to a predetermined sensing signal including a pivotally movable member extending through the aperture means and movable against the trip member to unlatch the trip member.

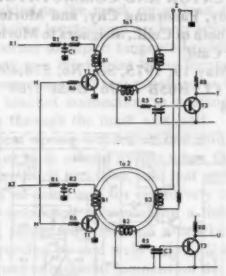
3,999,104

ELECTRONIC SAFETY CIRCUITS

Regis Lardennois, Verriere Le Buisson, France, assignor to Engins Matra, Paris, France

Filed Dec. 13, 1974, Ser. No. 532,363
Claims priority, application France, Dec. 14, 1973, 73.44907
Int. Cl.[2] H02H 3/24, 3/16
U.S. Cl. 317—31 1 Claim

1. A control circuit for detecting an electrical failure or malfunction, said circuit comprising a magnetic core having a rectangular hysteresis loop, first and second input windings on said core disposed to magnetize the core in opposite directions, means for applying input voltages to said windings, control means associated with said first input winding for causing current derived from the corresponding input voltage to flow intermittently through the first winding at timed intervals, means for applying another input voltage directly to the second input winding to cause current to flow continuously therethrough, to repetitively magnetize the core alternately in opposite directions, at least the first winding driving the core to saturation in one direction, an output winding on the core for producing output voltage pulses, means for applying said output voltage pulses to an integrating circuit, said integrating circuit being adapted to respond to the duration of the voltage pulses and to provide an indication if the magnetic core is not driven to saturation in both directions of magnetization, a



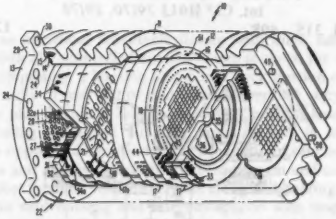
second substantially identical control circuit, means for connecting the control means of the first input windings of both circuits so that current flows simultaneously through both first input windings, and means for connecting the second input windings of both circuits in series relation in opposition to each other for connection to a reversible signal voltage.

3,999,105

LIQUID ENCAPSULATED INTEGRATED CIRCUIT PACKAGE

William Bogan Archey, Shelburne; Ronald Dominic Audi, Burlington; Roger James Clark, Underhill, and Robert James Redmond, Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 19, 1974, Ser. No. 462,462
Int. Cl.[2] H05K 7/20
U.S. Cl. 317—100 25 Claims

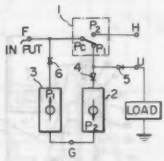


1. An integrated circuit package comprising
a semiconductor wafer, and
a semiconductor wafer carrier comprising,
a body of insulating material,
centrally disposed means on said body fixedly holding the semiconductor wafer at its center, and
means for bolstering the periphery of the wafer held on said centrally disposed means while permitting radial freedom of movement to the wafer held on said centrally disposed means to minimize the stress effects of thermal expansion mismatch between the carrier and the wafer held thereon.

3,999,106
ELECTRICAL SWITCH DEVICE

Shunsei Kratomi, No. 456, Maegawa, Odawara, Kanagawa, Japan

Filed June 10, 1975, Ser. No. 585,491
Claims priority, application Japan, June 14, 1974, 49-67189
Int. Cl.² H01H 47/00
U.S. Cl. 317—151 21 Claims



1. Switching apparatus including at least one electrical switch device which comprises:

a bi-stable double-throw switching relay having at least one common contact and a pair of exclusively selectable contacts, said relay further having nongalvanic memory means for the two exclusively selectable contacts;

at least first and second energy storing means each having sufficient energy storage capacity for driving said relay;

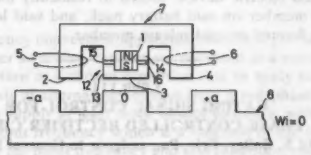
means coupling said first energy storing means to a first contact of said relay such that: said first energy storing means is charged with energy while said first contact is selected by said common contact of said relay and while said common contact of said relay is coupled to a first pole of a direct-current power source; and the energy thus stored in said first energy storing means is discharged to drive said relay so as to make a change-over of said common contact from the first to the second selectable contact when said common contact is turned off from said power source and

means coupling said second energy storing means to said relay such that: it is charged with energy while said common contact of said relay is turned on to another pole of said direct-current power source: and such that the energy thus stored in said second energy storing means is discharged to drive said relay so as to make a reverse change-over of said common contact from the second to the first selectable contact when said common contact is turned off from said power source.

3,999,107
SELF-STARTING SYNCHRONOUS MOTOR

Hans-Werner Reuting, Peine, Germany, assignor to Elmeg Elektro-Mechanik GmbH, Peine, Germany

Filed June 16, 1975, Ser. No. 587,130
Claims priority, application Germany, June 20, 1974, 2429492
Int. Cl.² H02K 41/02
U.S. Cl. 318—135 20 Claims



1. Electromagnetic motor comprising:

a stator having three pole shoes, one of which being permanently magnetically biased and a divided magnetic return flux runs through the two other pole shoes;

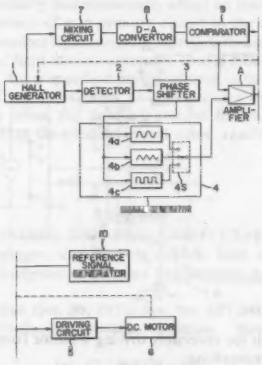
a movable element having at least two pole shoes of similar width and being magnetically interconnected to complete separate paths for said divided magnetic flux, the two poles of the movable element being spaced differently than the said three pole shoes are spaced from each other, so that in a symmetrical position of one of the shoes of the element relative to a central one of said stator pole shoes, another of the pole shoes of the element is asymmetrically positioned to each of the other two stator pole shoes, whereby a stable neutral position for the element is defined by a position of any of the pole shoes of the element opposite the biased stator pole shoe, while at least one respective other pole shoe of the movable element returns said divided flux to said two other pole shoes, so that the movable element experiences oppositely directed, balanced driving forces; and

coil means including a coil on or in magnetically coupled relation with one of said other stator pole shoes to provide a flux thereto to modify said forces towards imbalance, so that the element is moved by a distance at least half a spacing between two of the poles of the movable element and towards a position in which the other one of the poles of the elements faces said biased pole shoe.

3,999,108
SPEED REGULATION SYSTEM FOR DC MOTORS WITH HALL GENERATORS

Kinji Tanikoshi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 388,953, Aug. 16, 1973, abandoned.
This application July 14, 1975, Ser. No. 595,419
Int. Cl.² H02K 29/00
U.S. Cl. 318—138 5 Claims



1. A DC motor and control system therefore comprising, in combination:

a. A DC motor comprising

a rotor having magnetic poles of opposite polarities thereon and a non-uniform magnetic flux distribution, and

stator windings positioned in torque-producing relation to said rotor;

b. Hall generators positioned in flux-sensing relation to said magnetic poles so as to detect the instantaneous rotational speed thereof and to generate electrical signals with a frequency representing the instantaneously changing rotational speed of said DC motor;

c. means connected to said Hall generators for detecting the crest or peak values of the output signals of said Hall generators so as to generate pulse signals representing said crest or peak values,

d. means for generating a signal of a waveform corresponding to the magnetic flux distribution of said rotor to retain an axis output of said DC motor constant by compensating for a magnetic flux distribution inherent to the field of said DC motor comprising:

a plurality of waveform generators each adapted to be triggered in response to the pulse signals from said pulse signal generating means to generate the signal with the desired waveform, and switching means for selectively outputting the output signals with various waveforms of said waveform generator, whereby a signal with a desired waveform for compensating for the flux distribution in the DC motor may be developed,

e. motor speed detecting means disposed independently of said Hall generators for generating electrical signals representative of said instantaneous rotational speed of said rotor,

f. amplifier means to which are applied the output signals from said waveform generating means and the output signal of said motor speed detecting means,

said amplifier means being adapted to control the amplification gain of the output signals from the waveform generating means in response to the level of the output signal from said motor speed detecting means, and

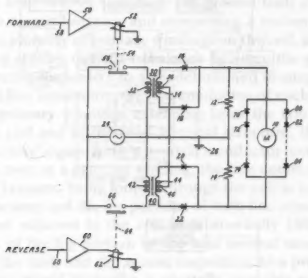
g. driving control means connected to both said amplifier means and said stator windings for applying an exciting current to said windings in response to the output of said amplifier means.

3,999,109

D-C MOTOR CONTROL CIRCUIT

Robert P. DePuy, Cherry Hill, N.J., assignor to General Electric Company, Philadelphia, Pa.

Filed May 9, 1975, Ser. No. 575,873
Int. Cl.² H02P 1/22
U.S. Cl. 318—293 **4 Claims**



1. A circuit for reversibly driving a motor from an a-c voltage source comprising:

a. first switch means for selectively connecting the a-c voltage source across the primary winding of a first transformer;

b. a first rectifying means for generating a unipolar voltage with respect to a reference connected in series with the secondary of the first transformer and with one terminal of the motor;

c. a first resistor connected in series with the other terminal of the motor and the reference;

d. second switch means for selectively connecting the a-c voltage source across the primary winding of a second transformer;

e. a second rectifying means for generating a unipolar voltage with respect to the reference connected in series with the secondary of the second transformer and with said other terminal of the motor; and

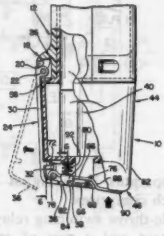
f. a second resistor connected in series with said one terminal of the motor and the reference; whereby current is supplied to the motor in one direction when the a-c voltage source energizes the first transformer and in the other direction when the a-c voltage source energizes the second transformer.

3,999,110

BATTERY PACK AND LATCH

Lee Webber Ramstrom, Kingsville; Alvydas Petras Karasa, Belair, and Stanley Alan Markle, Lutherville, all of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Feb. 6, 1975, Ser. No. 547,646
Int. Cl.² H02J 7/00; E05C 13/00; E05B 15/02
U.S. Cl. 320—2 **33 Claims**



1. Quick release securing means for removably securing first and second items together, comprising a latch member movably mounted on said first item, release means mounted on said second item, said release means comprising a release member pivotally mounted on pivot pin means, spring means in said release means adapted to urge said release member to a normal position, said release member comprising a locking portion, means on said latch member engagable with said locking portion in the latched condition of said latch member on said release means, and a manually operable portion of said release member adapted to move said release member about said pivot pin means to disengage said locking portion from said latch member engaging means.

17. Means for securing a separable case adapted to be at least partially telescoped within a housing to said housing, said securing means comprising a latch member pivotally mounted on one of said housing and said separable case and a release member movably mounted on the other of said housing and said separable case, said latch member having a portion coextensive with the portion of said case which is not telescoped within said housing, said securing means comprising at least one notch engageable with at least one locking finger and a manually operable portion adapted to effect disengagement between said locking finger and said notch, said manually operable-portion being connected to one of said locking finger and said notch for movement thereof out of engagement with the other, said other of said locking finger and said notch being connected to said latch member for movement away from the latched position of said one of said locking finger and said notch upon movement of said manually operable portion, said notches being formed in said latch member and said latch member being mounted on said housing, said case comprising a slide-in battery pack, said housing comprising a portion of a cordless electric device, means to resiliently mount said release member on said battery pack, and said locking finger being formed on said release member.

3,999,111

GATING SIGNAL CONTROL FOR A PHASE-CONTROLLED RECTIFIER CIRCUIT

Ronald B. Bailey, Erie, Pa., assignor to General Electric Company, Erie, Pa.

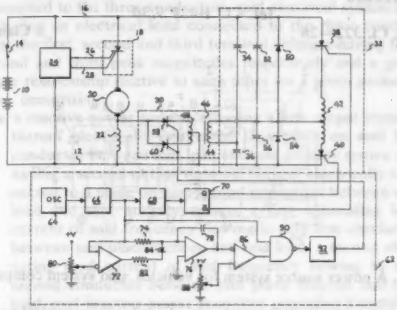
Filed Nov. 14, 1975, Ser. No. 632,094
Int. Cl.² H02P 13/16, 7/06
U.S. Cl. 321—2 **10 Claims**

9. A method for controlling the phase retard time of a phase-controlled rectifier circuit in a power conversion system of the type including a source of periodic clock pulses and a clock pulse synchronized alternating current source for sup-

plying alternating current power to said phase-controlled rectifier circuit, said method comprising the steps of:

a. delaying said clock pulses for a predetermined time period to produce delayed clock pulses;

b. applying said delayed clock pulses to control operation of said alternating current source;



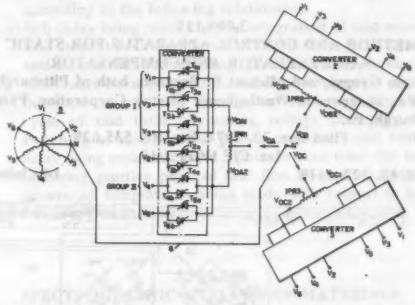
c. delaying said clock pulses for a variable time period greater than said predetermined time period but no greater than the interval between successive clock pulses to produce gating singals; and

d. applying said gating signals to control operation of said phase-controlled rectifier circuit.

3,999,112
POLYPHASE FREQUENCY CONVERTER

Laszlo Gyugyi, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1975, Ser. No. 575,887
Int. Cl.² H02M 5/27
U.S. Cl. 321—7 **1 Claim**



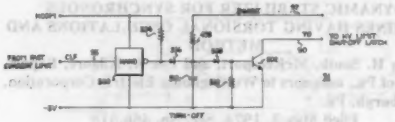
1. In frequency conversion apparatus wherein a plurality of bilateral power switching devices are operated in a repetitive switching pattern at a chosen repetition rate to apply successive increments of alternating voltages from a polyphase voltage source to supply at least three output terminals with current at an output frequency which is a function of the difference between the input frequency and said repetition rate, the combination of:

at least three interphase reactor means respectively associated with said three output terminals, each of said interphase reactor means combining currents from two respective groups of said bilateral switching devices and having a center tap connected to a corresponding one of said three output terminals with said interphase reactor means being mounted on a common magnetic core.

3,999,113
OVERCURRENT DETECTION APPARATUS FOR CONTROLLING POWER SUPPLIES

Daniel J. McCoy, Roanoke, Va., assignor to General Electric Company, Salem, Va.

Filed Dec. 24, 1974, Ser. No. 536,285
Int. Cl.² H02H 7/122
U.S. Cl. 321—12 **13 Claims**



1. A power conversion system of the inverter type for supplying electrical power from a source to a load comprising:

a. a controllable power inverter having a primary circuit connectable to the source and a secondary circuit coupled to said primary circuit for supplying controlled power to the load;

b. switching means for controlling the percentage of time that said primary circuit is connected to the source; and,

c. means for limiting the current in said primary circuit including:

1. means to provide a monitor signal proportional to the instantaneous value of the current in said primary circuit,

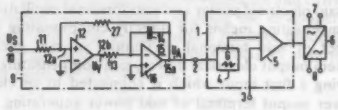
2. first limit means responsive to said monitor signal to substantially instantaneously effect an inhibiting of the connection of said primary circuit to the source when said monitor signal exceeds a predetermined value, and

3. second limit means responsive to said monitor signal to effect, for a specified period of time, a further inhibiting of the connection of said primary circuit to the source when the time integral, of the monitor signal exceeding the predetermined value, reaches a defined value.

3,999,114
CONTROL UNIT FOR A CONVERTER

Herbert Poppinger, and Ludwig Schick, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 30, 1975, Ser. No. 627,340
Claims priority, application Germany, Nov. 4, 1974, 2452228
Int. Cl.² H02M 1/08
U.S. Cl. 321—47 **8 Claims**



1. In a control unit for an externally controlled, externally commutated converter which includes means having as inputs a synchronizing voltage and a variable d.c. control voltage for comparing said voltages and forming firing pulses for the converter rectifiers of the converter and smoothing means between the means forming firing pulses and the synchronization voltage input, an improved smoothing means comprising:

a. an amplifier having as an input the synchronizing voltage;

b. means for limiting the output of said amplifier; and

c. a first integrator having its input coupled to the limited output of said amplifier and its output fed back to the input of said amplifier, the output of said integrator being

coupled to the synchronizing voltage input of said means for forming firing pulses.

3,999,115

DYNAMIC STABILIZER FOR SYNCHRONOUS MACHINES HAVING TORSIONAL OSCILLATIONS AND METHOD

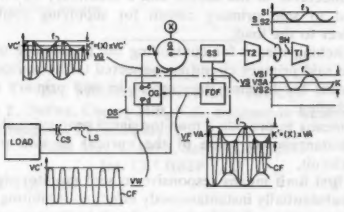
William H. South, McKeesport, and Lee A. Kilgore, Export, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 2, 1974, Ser. No. 466,318

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² H02H 7/06; H02P 9/00

U.S. Cl. 322—25 24 Claims



1. A dynamic stabilizer for compensating for the effect on output electrical power of torsional oscillation in a resilient shaft between masses of an electrical power generating system which is capable of generating electrical power at a nominal frequency, comprising:

a. torsional oscillation sensing means for sensing said torsional oscillation, said torsional oscillation sensing means having an output, said torsional oscillation sensing means providing a torsional oscillation output signal at said latter output which latter signal is related to said torsional oscillation;

b. transfer means for operating on said torsional oscillation output signal, said transfer means having an input and an output, said transfer means input being connected to said torsional oscillation sensing means output to receive said torsional oscillation output signal, said transfer means operating on said torsional oscillation output signal in such a manner as to provide a resulting transfer means output, signal at said transfer means output which is characterized as being related to said nominal frequency of said electrical power and said torsional oscillation; and

c. compensating means for directly compensating for the effect of said torsional oscillation on said generating system output electrical power, said compensating means having a first input which is connected to an electrical power output terminal of said power generating system where said output electrical power is available, said compensating means having a second input which is connected to said output of said transfer means, said compensating means having an output which is connectable with a load, said compensating means receiving said output electrical power from said generating system at said first input which power is affected by said torsional oscillation, said compensating means receiving said transfer means output signal, said later signal being utilized by said compensating means to operate directly on said output electrical power to thereby make available to said load electrical power which is generally unaffected by said torsional oscillation even though said torsional oscillation is present in said shaft.

3,999,116

POWER SOURCE SYSTEM FOR VEHICLES

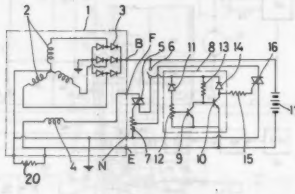
Koichi Azuma, 22 Miyuki, Shikamaku, Himeji, Japan

Continuation-in-part of Ser. No. 451,708, March 15, 1974, abandoned. This application May 29, 1975, Ser. No. 582,409

Claims priority, application Japan, Nov. 27, 1973, 48-133236

Int. Cl.² H02P 9/30

U.S. Cl. 322—28 2 Claims



1. A power source system for vehicles, said system comprising:

a generator including stator windings having a neutral point and a DC output terminal, and a field winding having a field winding terminal and a grounded terminal;

a first triac connected across said DC output terminal of said generator and said field winding terminal;

a first potentiometer, a gate of said first triac being connected to said neutral point of said stator winding through said first potentiometer;

a second triac;

a transistor relay;

an intermediate point of said first potentiometer being connected through said second triac to both said transistor relay and to said neutral point of said stator winding, wherein said transistor relay and second triac operate to vary the rate of feeding of direct current to said field winding through said first triac, whereby stable alternating and direct currents are independently obtained.

3,999,117

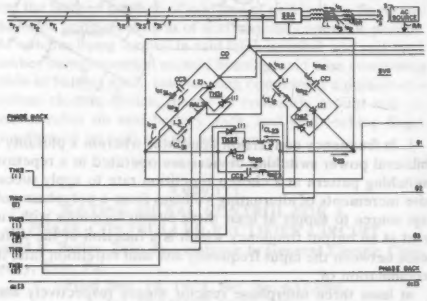
METHOD AND CONTROL APPARATUS FOR STATIC VAR GENERATOR AND COMPENSATOR

Laszlo Gyugyi, and Michael B. Brennen, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 23, 1974, Ser. No. 535,629

Int. Cl.² H02J 3/18

U.S. Cl. 323—119 14 Claims



1. Apparatus for providing reactive power to an alternating current electrical system which includes three electrical conductors, where there is a first alternating voltage of predetermined frequency present between a first and a second of the conductors, a second alternating voltage of said frequency

present between the second and a third of said conductors, and a third alternating voltage of said frequency present between the third and the first of said conductors, first, second and third terminal voltages each of which is present respectively between said first, second and third conductors and a common electrical reference point, said electrical system also including a primary source of alternating electrical power connected to the three conductors, said electrical system also including an electrical load connected to the three conductors, the first, second and third terminal voltages having first, second and third peak magnitudes respectively and a given phase relationship relative to each other for a given period of time, comprising:

a. a reactive power generator having a first output terminal thereof electrically connected to a place on said first conductor between said load and said primary source and having a second output terminal thereof electrically connected to a place on said second conductor between said load and said primary source, a first alternating load current of said frequency flowing in said first conductor between said place thereon and said load, a second alternating load current of said frequency flowing in said second conductor between said place thereon and said load, said reactive power generator providing a compensating current of said frequency at said first output terminal during a switch controlled portion of a given half cycle of said first alternating voltage, said compensating current being vectorially added to said first alternating load current, a first alternating primary source current of said frequency which flows in said first conductor between said primary source and said place where said first output terminal is connected to said first conductor thus being in predetermined fixed phase relationship with said first terminal voltage for a half cycle, said switch controlled portion being related to a calculated switch delay; and

b. calculator and sensor means for sensing values of said load currents and said voltages and calculating said switch delay as a function thereof, said calculator and sensor means being connected to said reactive power generator for switching said reactive power generator to thus provide said portion of said compensating current according to the following relationship:

switch delay being related to the integration of said second load current over the interval of that positive half cycle of said second alternating voltage preceding the switching of said reactive power generator, and the integration of said first load current over the interval of that positive half cycle of said third alternating voltage preceding the switching of said reactive power generator, said switch delay being measured from a point in time when the next following positive peak of said first alternating voltage occurs, all integrations being made with respect to said frequency times time.

3,999,118

SPECTROGRAPHIC ANALYSIS OF MATERIALS

David Ian Hoult, Wilmslow, England, assignor to National Research Development Corporation, London, England

Filed Feb. 27, 1975, Ser. No. 553,725

Claims priority, application United Kingdom, Apr. 8, 1974, 15530/74

Int. Cl.² G01R *33/08*

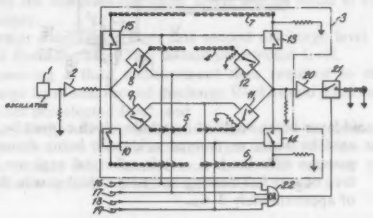
U.S. Cl. 324—.5 A **4 Claims**

1. Nuclear magnetic resonance apparatus comprising:

pulse modulated radio-frequency transmitter means for exciting a specimen by means of a train of radio-frequency pulses, successive ones of which are in relative phase quadrature;

receiver means for producing two audio frequency signals in response to the detection of transient radio-frequency resonance signals from the specimen so excited, said receiver means comprising;

similar first and second detector means each having first and second inputs and each producing, in response to the application of first and second sinusoidal signals respectively to its first and second inputs, an output signal having a frequency and phase angle whose values are respectively equal to the differences between the frequencies and phase angles of said first and second sinusoidal signals,



means for applying to the respective first inputs of said first and second detector means two substantially identical sinusoidal signals derived from and having the same transient form as said resonance signals, and

means for applying to the respective second inputs of said first and second detector means first and second sinusoidal reference signals which are substantially identical except for being in phase quadrature and which have a frequency close to that of said two substantially identical signals.

3,999,119

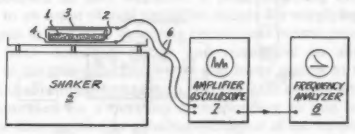
MEASURING TONER CONCENTRATION

Jan Bares, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 26, 1975, Ser. No. 562,296

Int. Cl.² G01R *29/12*

U.S. Cl. 324—32 **14 Claims**



1. A method for determining toner concentration in an electrostatographic developer containing carrier particles and toner particles which comprises disposing an electrostatographic developer comprising toner particles and carrier particles between two electrodes, agitating the developer to produce electronic noise generated as a result of triboelectrification, and measuring said generated noise to determine the concentration of toner present.

3,999,120

SPHERICAL SECTOR FOR SENSOR PROBE

Ludwig Streng, Falkenstrasse 9, 7036 Schonaich, Germany

Filed Oct. 4, 1974, Ser. No. 512,101

Claims priority, application Germany, Oct. 12, 1973, 7337864

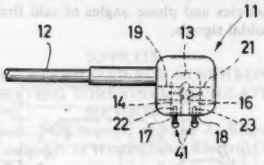
Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 TK **5 Claims**

1. A sensor probe for measuring the thickness of thin, non-ferromagnetic layers on a ferromagnetic base, including a magnet with at least partially spherical sector-shaped pole pieces having a layer made of a hard wear-proof material on that side of the pole pieces which is exposed to wear.

said magnet having a soft iron yoke, with matching front faces,

said pole pieces each comprising a ground ball bearing ball fastened to each of the front faces of said magnet yoke by electric spot welding,



said layer being made of a carbide which cannot be dissociated by water or thinned acids and being deposited by gaseous diffusion in a certain spherical angle on the surface of said ball bearing and with a thickness in the range of approximately 3–6μ.

3,999,121

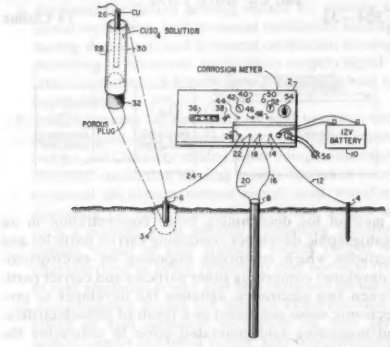
WELL CASING CORROSION METER

John M. Taylor, Jr., Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,845

Int. Cl.² G01R *27/02*

U.S. Cl. 324—65 CR **9 Claims**



1. Apparatus for measuring the external corrosion current of a well casing comprising:

a voltmeter coupled to said well casing,

a reference electrode in contact with the earth and coupled to said voltmeter for providing a reference voltage to allow detection of changes in the well casing to earth potential,

a variable current source coupled to the earth and to said well casing for supplying a test current to the casing to earth circuit to cause a preselected voltage change in the casing to earth potential of less than about 0.020 volt, and

current detecting means for detecting the test current supplied to said casing to earth circuit by said current source, whereby said corrosion current is proportional to the ratio of said current to said voltage change. a

3,999,122

SEMICONDUCTOR SENSING DEVICE FOR FLUIDS

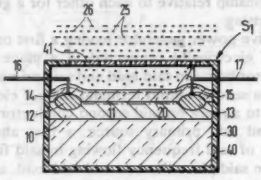
Guenter Winstel, Ottobrunn, and Johannes Rachmann, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 14, 1975, Ser. No. 549,893

Claims priority, application Germany, Feb. 14, 1974, 2407110

Int. Cl.² G01N *27/52*

U.S. Cl. 324—71 SN **16 Claims**



1. A sensor device for detecting fluid substances, comprising:

a substrate of an inorganic insulating material,

an epitaxially grown layer of an inorganic semiconductor material on a surface of said substrate,

a source zone and a spaced-apart drain zone of a given conductivity type on said epitaxially grown layer and a channel zone of said conductivity type interconnecting said drain and source zones with one another,

an electrical lead on each of said drain and source zones for interconnecting said sensor device with an operational electrical circuit,

a relatively thin layer of a reactive organic material capable of reversible interaction with fluid substances being detected, said organic material being selected from the group consisting of carotenoids, proteins, phthalocyanines, polyvinyl chlorides, polypropylenes, cellulose acetate and mixtures thereof, said layer being in direct contact with a free surface of said epitaxially grown layer,

whereby upon energization of said sensor device in the presence of a fluid substance, a reversible reaction occurs between said substance and said organic material and causes a reversible change in the surface potential of said layer due to a field effect and causes a reversible change in the resistance of said channel zone so that the drain current of said sensor is changed.

3,999,123

DIGITAL VOLTAGE LEVEL MEASURING DEVICE

Gerhard Thoener, Deisenhofen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 13, 1975, Ser. No. 549,657

Claims priority, application Germany, Feb. 19, 1974, 2407968

Int. Cl.² G01R *17/06*; H03K *13/02*; G01R *15/10*

U.S. Cl. 324—99 D **7 Claims**

1. A digitally and logarithmically evaluating voltage measuring device comprising:

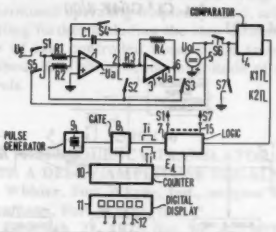
a. an integrating amplifier having an input for a voltage to be measured logarithmically and a capacitor connected between said input and an output thereof to provide a linear integrating feed back;

b. a first switch to connect and disconnect the voltage to be measured to and from the integrating amplifier input for a given first period of time, whereby an output voltage of said integrating amplifier represents the integration result achieved upon the expiration of said first period of time;

c. connection means by which the amplifier output voltage is fed back to the amplifier input during an exponential feed back phase which follows the said first period of time;

d. digital measuring means whereby a second interval of time from the beginning of the exponential feed back phase until the reaching of a reference voltage by the output voltage altering within said exponential feed back phase is digitally measured; and

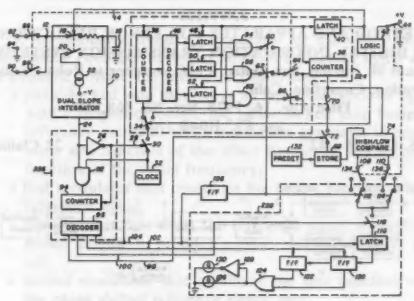
e. means for feeding back the output voltage to the integrating amplifier input with the same polarity as the input voltage when said output voltage, which increases in absolute value during the given first period of time, does not reach said reference voltage value and for feeding back the output voltage with a polarity opposite to that of the input voltage when the reference voltage is exceeded in absolute value by the output voltage.



3,999,124
REFERENCE QUANTITY AND UNKNOWN QUANTITY COMPARATOR

Jerry D. Haney, Sunnyvale, Calif., assignor to Romilly John Simms, Menlo Park, Calif.

Filed Mar. 24, 1975, Ser. No. 561,601
Int. Cl.² G01R 17/06; G08B 21/00
U.S. Cl. 324—99 D **26 Claims**



1. A method of determining when an unknown electrical signal quantity is within a desired range of a reference electrical signal quantity, comprising the steps of:

a. obtaining a first measurement time proportional to the value of said reference quantity,

b. integrating said unknown quantity for a first preselected integration time period to obtain a first integrated level,

c. discharging from said first integrated level to a first discharge level at a fixed discharge rate for a first preselected discharge time period,

d. further discharging from said first discharge level at said fixed discharge rate to a preselected level,

e. measuring a second measurement time required to discharge from said first discharge level at said fixed rate to said preselected level,

f. integrating said unknown quantity for a second preselected integration time period to obtain a second integrated level,

g. discharging from said second integrated level to a second discharge level at said fixed discharge rate for a second preselected discharge time period, one of said first preselected time periods and one of said second preselected time periods being selected such that when the value of each of the limits of said desired range is integrated for a respective one of said first and second preselected integration time periods and discharged for a respective one of said first and second preselected discharge time periods the resultant discharge levels will be equal to one another,

h. further discharging from said second discharge level at said fixed discharge rate to said preselected level,

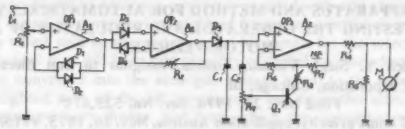
i. measuring a third measurement time required to discharge from said second discharge level at said fixed rate to said preselected level, and

j. comparing said measurement times with one another, such that when the first measurement time is between the second and third measurement times, the value of the unknown quantity is within said desired range.

3,999,125
PEAK DETECTOR HAVING SIGNAL RISE-TIME ENHANCEMENT

Masashi Takeda, Isehara, and Atsushi Matsuzaki, Yokohama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1975, Ser. No. 570,359
Claims priority, application Japan, Apr. 25, 1974, 49-46943
Int. Cl.² G01R 19/16
U.S. Cl. 324—103 P **12 Claims**



11. A peak detector circuit having rise-time enhancement of input signals, comprising an amplifier; gain determining means coupled to said amplifier; a peak detecting circuit coupled to an input of said amplifier; means for supplying an input signal to said peak detecting circuit; and means coupled to said peak detecting circuit and responsive to abrupt changes in the rise-time portion of said input signals to vary said gain determining means such that the gain of said amplifier is increased for a duration corresponding to said input signal rise-time portion to enhance the signal at the output of said amplifier during said rise-time portion.

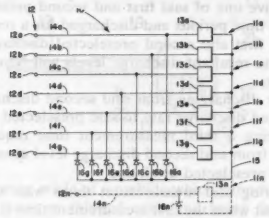
3,999,126
TEST DEVICE FOR SIMULTANEOUSLY DISPLAYING THE LEVEL OF LOGIC SIGNALS IN A PLURALITY OF CIRCUITS

Robert J. Gabor, Mentor, Ohio, assignor to A & P Products Incorporated, Painesville, Ohio

Filed Apr. 17, 1975, Ser. No. 561,112
Int. Cl.² G01R 19/16, 31/02
U.S. Cl. 324—133 **12 Claims**

1. A test device for simultaneously displaying the level of electrical logic signals occurring in a plurality of circuits, comprising a plurality of input circuit means for providing a respective connection between each of said plurality of circuits and said test device; a plurality of electrically responsive display means for indicating the level of such logic signals, each display means having respective first and second terminals, the former being connected to a respective input circuit means and the latter all being coupled in a common connection; a plurality of diode means for conducting electric current in a single direction, each diode means having first and second terminals, and each of said diode means being connected at one of said first and second terminals in reverse poled relation

to a respective one of said input circuit means, the other ones of said first and second terminals being coupled to said common connection; and whereby occurrence of a first logic level signal on any one of said input circuit means effects current



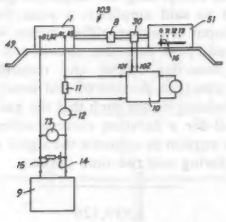
flow through respective display means connected thereto with a return current path being provided through said common connection and at least one of said diode means connected to one of said input circuit means on which a second logic level signal different from such first logic level signal is occurring.

3,999,127

APPARATUS AND METHOD FOR AUTOMATICALLY TESTING THE GENERATOR AND REGULATOR OF A MOTOR VEHICLE

Erich Y. Siegl, Vienna, Austria, assignor to Sun Electric Corporation, Chicago, Ill.

Filed Nov. 20, 1974, Ser. No. 525,671
Claims priority, application Austria, Nov. 26, 1973, 9915/73
Int. Cl.² G01R 31/02
U.S. Cl. 324—158 R 12 Claims



1. A method for testing an apparatus for producing an output voltage and an output current, said apparatus having predetermined performance characteristics and rotatable coil means, comprising the steps of:

limiting said output voltage substantially to a predetermined voltage threshold;

variably rotating said rotatable coil means;

sensing said output current to determine the zero-watt rotary speed of said apparatus, said apparatus initiating production of said output current whenever said output voltage substantially equals said predetermined voltage threshold;

rotating said rotatable coil means at a first and second rotary speed above said zero-watt rotary speed;

measuring said output current at said first and second rotary speeds; and

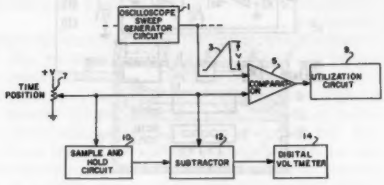
comparing said zero-watt rotary speed, said first rotary speed output current and said second rotary speed output current with said predetermind performance characteristics.

3,999,128

TIME INTERVAL MEASUREMENT METHOD AND APPARATUS

Pedro Max Janowitz, Portland, and James William Godwin, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 18, 1975, Ser. No. 569,418
Int. Cl.² G04F 8/00
U.S. Cl. 324—181 11 Claims



1. A method for measuring selectable time intervals along a linear ramp time-base waveform, comprising the steps of:

selecting a first voltage which is proportional to the time position of a first selected point along said time-base waveform;

storing said first voltage in a memory device;

selecting a second voltage which is proportional to the time position of a second selected point along said time-base waveform;

subtracting said first voltage from said second voltage in an arithmetic device to produce a difference voltage proportional to the time difference between said selected points; and

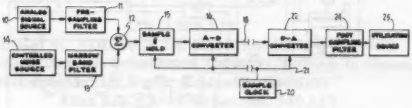
applying said difference voltage to a digital voltmeter adapted to provide a numerical readout in time units.

3,999,129

METHOD AND APPARATUS FOR ERROR REDUCTION IN DIGITAL INFORMATION TRANSMISSION SYSTEMS

James M. Kasson, San Mateo, Calif., assignor to Rolm Corporation, Cupertino, Calif.

Filed Apr. 16, 1975, Ser. No. 568,769
Int. Cl.² H04B 1/00
U.S. Cl. 325—42 22 Claims



1. A method of reducing idle channel, cross talk and quantizing error noise in a digital information transmission system, said method comprising the steps of:

a. generating an analog input signal having a spectral content lying within a predetermined operating frequency band;

b. generating a controlled noise signal train having a spectral content devoid of frequency components within the limits of said operating frequency band and narrowly centered about a predetermined frequency lying substantially outside said operating frequency band by producing a signal train and narrowly filtering said signal train to remove substantially all components having a frequency deviating from said predetermined frequency;

c. combining said analog input signal and said controlled noise signal train to produce a composite signal;

d. converting said composite signal to digital form at a sampling rate substantially greater than the upper limit of

said predetermined frequency band by quantizing said composite signal with a predetermined number of quantizing levels each having a predetermined magnitude;

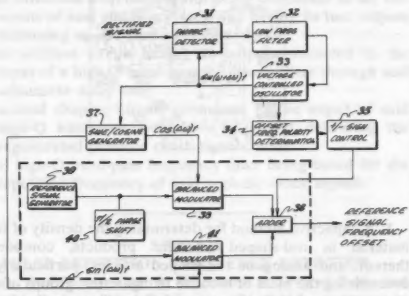
e. subsequently reconverting said digital signals to analog form; and,

f. filtering said reconverted analog signal to remove substantially all the frequency components lying outside said predetermined operating frequency band, said step (b) of generating further including the step of limiting the amplitude of said controlled noise signal train to a range from about ¼ to about ½ the magnitude of said quantizing levels.

3,999,130
AUTOMATIC FREQUENCY TRANSLATOR FOR USE WITH A DELAY/AMPLITUDE EQUALIZER

Norman L. Whisler, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.

Filed Feb. 21, 1975, Ser. No. 527,677
Int. Cl.² H03D 7/16
U.S. Cl. 325—433 **3 Claims**



3. An automatic frequency translator for use with a delay-/amplitude equalizer having as an input a received signal with a frequency offset, the translator comprising:

a phase-locked loop that has as an input the received signal with a frequency offset, the phase-locked loop having a reference oscillator and a sine/cosine generator to generate a sine function of the offset frequency and a cosine function of the offset frequency;

a first modulator that combines the cosine function with a reference signal;

a phase shifter that shifts the reference signal a predetermined amount to produce a phase shifted reference signal;

a second modulator that combines the sine function with the phase shifted reference signal; and

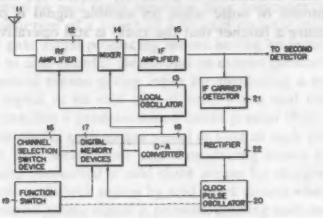
means to sum the first modulator and second modulator outputs to produce a signal for use with the equalizer.

3,999,131
CHANNEL-SELECTING APPARATUS FOR MULTICHANNEL RECEIVERS

Takeo Fukuda, Yokohama, and Kenichi Torii, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 415,786, Nov. 14, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,381
Claims priority, application Japan, Nov. 14, 1972, 47-114117
Int. Cl.² H04B 1/26
U.S. Cl. 325—453 **7 Claims**

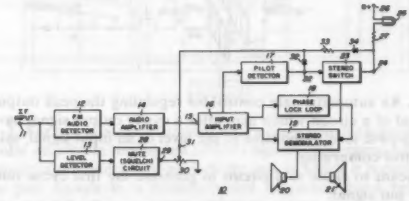
1. In a channel-selecting apparatus for a multi-channel receiver designed to determine the oscillation frequencies of a local oscillator and/or the tuning frequencies of a radio-frequency amplifier for all the channels by varying the analogue dc voltages being applied to a frequency control element such as a variable capacitance diode provided in the oscillator and/or the amplifier in accordance with channel selective operation, the improvement being that said channel-selecting apparatus comprises a channel switch means capable of at least individually selecting all the channels; a plurality of digital memory devices being equal in number to the channels coupled with said channel selection switch means, and each comprising a plurality of binary memory units which previously store binary coded digital bit signals equivalent to a predetermined analogue voltage being applied to said frequency control element assigned to the corresponding one of the respective channels, and from which the stored binary coded digital bit signals for the channel selected upon the operation of said channel selection switch means are read out; and a digital-to-analogue converter coupled with said plurality of digital memory devices and said frequency control element by which said binary coded digital bit signals for the selected channel read out from said plurality of digital memory devices are converted into the analogue voltage equal to the binary-weighted sum of the bit signals read out from the selected digital memory device, and from which the converted analogue voltage for the selected channel is supplied to said frequency control element.



3,999,132
STEREO INHIBIT CIRCUIT

Paul Lee Smith, Hanover Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 31, 1975, Ser. No. 627,586
Int. Cl.² H04B 1/06
U.S. Cl. 325—455 **9 Claims**



1. An improved stereo inhibit circuit adaptable for use with FM stereo decoders in a radio having a stereo indicating light; the circuit comprising:

a demodulator circuit means for receiving modulated input signals and producing output signals corresponding to the modulation of said input signals;

decoder means coupled to said demodulator means for receiving said output signals and including, means for detecting the presence of a pilot signal in said output signals and producing an electrical detect signal in response thereto, switch means, including indicator means, coupled to said detecting means for receiving said electri-

cal detect signal for producing a visual indication of the presence of a pilot signal in response thereto, and means for producing audible signals in response to said output signals;

means coupled to said demodulator circuit means for producing a mute signal related to the amount of signal noise contained in said output signals; and

inhibiting means, coupled between said mute signal producing means and said switch means, for preventing said switch means from responding to said electrical detect signal and permitting the creation of said audible signals in response to the amount of the noise in said output signals exceeding a predetermined level, whereby the visual indication is positively muted for an excessive amount of noise while an audible signal is provided to assure a listener that the radio is still operative.

3,999,133

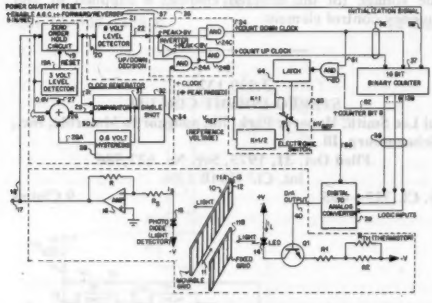
AUTOMATIC GAIN CONTROL FOR TRANSDUCER CIRCUIT

Siu Kee Lee, Sunnyvale, and John Cuda, Saratoga, both of Calif., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,867

Int. Cl.² H03K 3/42

U.S. Cl. 328—2 5 Claims



1. An automatic gain control for regulating the peak output signal of a circuit which generates a cyclic output signal having a peak level responsive to the level of an input signal, said control comprising:

means to cause said circuit to generate the first cyclic output signal;

means to generate a second signal by adding a bias signal to said output signal;

means to generate a constant level signal equal to the peak value of said output signal after the output signal peak level has been reached;

means to compare the second signal and the constant level signal and generate a pulse when said signals are equal;

means to compare said cyclic signal peak value with a desired signal and generate a differential signal when said pulse is generated; and

means to readjust said circuit in response to said differential signal for causing said cyclic signal to have a new peak level adjusted toward said desired signal level.

3,999,134

METHOD AND APPARATUS FOR MEASURING THE DENSITY OF FILLING MATERIAL IN ROD-SHAPED SMOKERS' PRODUCTS TAKING INTO ACCOUNT THE MOISTURE OF THE FILLING MATERIAL

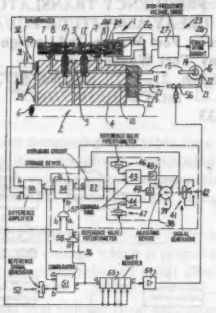
Heinz-Christen Lorenzen, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Aug. 12, 1975, Ser. No. 604,070

Claims priority, application Germany, Aug. 31, 1974, 2441332

Int. Cl.² A24B 9/00

U.S. Cl. 328—4 14 Claims



1. A capactive method for determining the density of filling material in rod-shaped smokers' products, components thereof, and analogous rod-shaped articles, particularly for determining the mass of tobacco in cigarettes, groups of cigarettes, the ends of cigarettes, and the like, comprising, in combination, the steps of generating for the respective articles respective first signals dependent upon both the density and the moisture of the filing material; generating a second signal dependent upon the moisture of the filling material; and processing the first and second signals to form for the respective articles respective third signals dependent upon the mass of the filling material but not exhibiting the moisture fluctuation dependency of the corresponding first signals, wherein said step of generating the second signal comprises determining from said third signals which of the articles are defective because they contain insufficient filling material and which are non-defective because they contain sufficient filling material, deriving an average signal from only those first signals derived from non-defective ones of the articles, and deriving the second signal from the average signal.

3,999,135

CLOCK SIGNAL REGENERATION SYSTEM OPERATING ON TERNARY PULSES

Claude Gourdon, rue Park-Bras, Perros-Guirec, France (22700), and Jean Thivend, 5 rue Haute Rive, Lannion, France (22300)

Filed July 1, 1975, Ser. No. 592,239

Claims priority, application France, July 30, 1974, 74.26409

Int. Cl.² H03K 1/17; H03B 1/00; H03K 5/00

U.S. Cl. 328—63 4 Claims

1. An apparatus for regenerating periodic clock signals in a ternary pulse transmission system, comprising:

an input transformer having a primary winding to which analog pulse signals are applied;

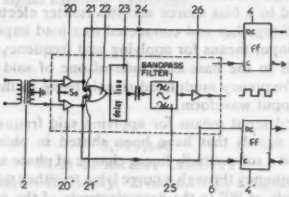
said input transformer having a secondary winding provided with two output terminals and a ground at the midpoint of said secondary winding;

said secondary winding providing between said midpoint and each of said output terminals respective voltages of opposite polarities;

a first shaping circuit comprising two threshold level comparators, each comparator having two inputs, one of the two inputs of each comparator being connected to a reference voltage and the other of the two inputs being connected to said secondary winding terminals;

an adjustable delay line;

said threshold level comparator having two outputs feeding through an addition circuit to the adjustable delay line;



said threshold level comparator being connected to the two inputs of said addition circuit and having its two outputs delivering square shape voltages;

said addition circuit having its output connected to the input of a high-Q band-pass frequency filter through said adjustable delay line;

a second shaping circuit connected to the ouput of said high-Q band-pass frequency filter and delivering the regenerated periodic clock signals; and,

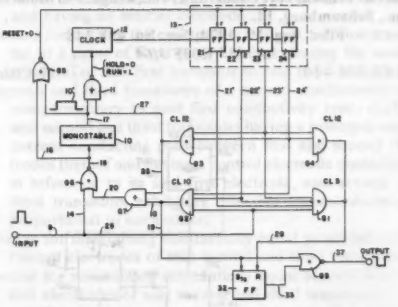
said high-Q band-pass frequency filter being tuned for the repetition frequency of said periodic clock signals.

3,999,136

PULSE REPETITION FREQUENCY DETECTOR

William A. O'Berry; Carl D. Wise, both of Severna Park, and Milton R. Lang, Jr., Baltimore, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1969, Ser. No. 812,634
Int. Cl.² H03K 9/06
U.S. Cl. 328—138 **9 Claims**



1. A pulse repetition frequency detector which produces an indication in response to incoming pulses occurring at a predetermined repetition rate and which is insensitive to the occurrence of incoming pulses at rates equal to even harmonics of such predetermined rate, said detector comprising:

a. input means for receiving pulses whose repetition rate is to be examined;

b. clock means for producing clock pulses at a clock rate which is *n* times the predetermined repetition rate to be detected;

c. counter means connected to said clock means for counting such clock pulses and having a capacity to count more than *n* pulses;

d. control means having a signal input connected to said input means, a gating input, and outputs connected to said clock means and said counter means for resetting said counter means to its 0 count state and then starting the production of clock pulses by said clock means only when a pulse appears at its said input in time coincidence when the presence of a gating signal at its said gating input;

e. first gate signal producing means having inputs connected to said input means and said counter means and an output connected to said control means gating input for producing a first gating signal at its said output only when a pulse is received by said input means in time coincidence with the production of a count of *n* by said counter means;

f. second gate signal producing means having an input connected to said counter means and an output connected to said control means gating input for producing a second gating signal at its said output only when said counter means reaches a predetermined count greater than *n* and for maintaining such gating signal as long as such count is present, said second gate signal producing means output also being connected to said clock means for stopping the production of clock pulses by said clock means whenever such second gating signal is present, causing said counter means to store such predetermined count; and

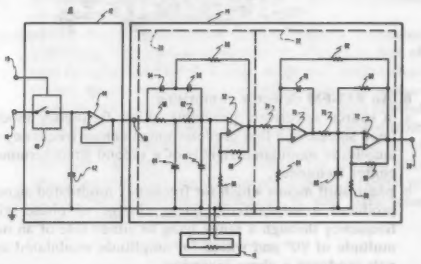
g. output indicator means connected to said, control means for producing an output indicator signal when three pulses occurring at the predetermined repetition rate have been received by said input means during an interval when pulses occurring at a synchronized even harmonic of such rate are not received.

3,999,137

LOW PASS ACTIVE FILTER APPARATUS

Dermot Thomas Fucito, Fairport, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,229
Int. Cl.² H03B 1/04
U.S. Cl. 328—167 **4 Claims**



1. For use in a signal transmission system which propagates pulse amplitude modulated (PAM) signals comprising pulses having a predetermined periodicity and in which it is desired to pass signals in a predetermined frequency band below about 4 KHz, low-pass active filter apparatus comprising:

a. first means which receives said PAM signal and produces at the output thereof the amplitude of each pulse of the PAM signals for the full period of the PAM signal rate,

b. a four-pole, low-pass, RC active filter network connected to the output of said first means, said active filter network comprising one and another series connected second-order active filter sections, said one and another active filter sections comprising a low frequency pole pair section and a high frequency pole pair section, respectively,

c. said one low frequency pole pair, second-order, active filter section, per se, having predetermined low-pass filter operation characteristics representable in an s-plane

graphical depiction of active circuit operation as a predetermined pattern of location of a complex pole pair relative to the s-plane coordinates,

d. said first means, per se, having a frequency response which causes undesired frequency roll-off in the desired pass band below 4 KHz, and

e. second means operatively associated with said one low frequency pole pair, second-order, active filter section for causing the complex pole pair to be moved away from said predetermined pattern of location such that the undesired frequency roll-off characteristic due to the first means is compensated to provide desired in-band frequency characteristics throughout said predetermined frequency band.

3,999,138

DETECTOR FOR AM-FM SIGNALS

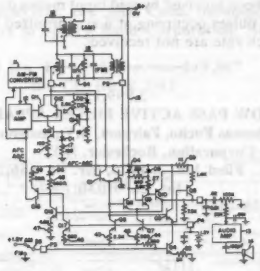
William Peil, North Syracuse, and Robert J. McFadyen, Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Continuation-in-part of Ser. No. 457,908, April 4, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,717

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.[2] H03D *3/22, 5/00*

U.S. Cl. 329—2 **23 Claims**



8. An AM-FM detector comprising:

a. a source selectively providing either frequency modulated signals of a first predetermined center frequency or amplitude modulated signals of a second predetermined center frequency,

b. phase shift means which for frequency modulated signals produces a substantially linear change of phase with frequency through a range lying to either side of an odd multiple of 90° and which for amplitude modulated signals produces a phase inversion,

c. a differentially connected emitter follower pair comprising a pair of transistors, the collectors of both transistors being jointly coupled to a bias source; the emitters of both transistors being jointly coupled to ground through a load impedance, and the base of one transistor being coupled to said source without phase shift and the base of the other transistor being coupled to said source through said phase shift means to produce at the joined emitters an output waveform representing the greater of the two input waveforms and having zero crossing widths proportional to the phase separation of the input wave;

whereby for FM operation an output wave-form is provided having a portion of one polarity which is broad and double peaked while having a portion of the other polarity which is narrow and single peaked, and whereby for AM operation full wave rectification is achieved; and

d. integrating means coupled to said load impedance which for FM operation converts said variable width portions of said other polarity to a time averaged waveform whose amplitude is proportional to said frequency deviation to obtain the original signal modulation and which for AM operation derives the average amplitude of said full wave rectified signal to obtain the original signal modulation.

13. A frequency modulation detector responsive to frequency modulated signals of predetermined center frequency, comprising:

a. a pair of transistors each having an emitter, base and collector electrode, the collector electrodes being connected to a bias source and the emitter electrodes being joined together and connected to a load impedance,

b. first input means for applying said frequency modulated signals to the base electrode of one of said transistors, said frequency modulated signals being in the form of a first input waveform,

c. second input means for applying said frequency modulated signals that have been shifted in phase so as to exhibit a substantially linear change of phase as a function of frequency through a range lying to either side of an odd multiple of 90° to the base electrode of the other of said transistors, the phase shifted frequency modulated signals being in the form of a second input waveform, said first and second transistors conducting in accordance with the predominant one of said first and second input waveforms so as to generate an output waveform at said load impedance which represents the predominant one of the two input waveforms and which intersects an established reference level with reference level crossing widths that are a function of the relative phase of said two input waveforms,

d. integrating means coupled to said load impedance for converting the output waveform to a time averaged waveform whose amplitude is proportional to said relative phase and therefore the frequency deviation of said signals, and

e. limiting means coupled between said load impedance and said integrating means for removing amplitude variations in said output waveform.

3,999,139

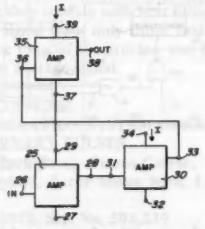
MONOLITHIC ALTERNATELY STACKED IF AMPLIFIER

Robert D. Fennell, Fort Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 19, 1974, Ser. No. 498,348

Int. Cl.[2] H03F *3/04*

U.S. Cl. 330—16 **19 Claims**



10. An amplifier circuit stage comprising:

a first cascode amplifier stage comprising a first and second transistor with said first transistor being the input device and having its base adaptable for receiving an input signal and its collector coupled to the emitter of said second transistor, the collector of said second transistor coupled to a load;

a third transistor with its emitter coupled to the emitter of said first transistor;

a DC constant current source coupled to the emitters of said first and third transistors;

AC coupling means for coupling the emitters of said first and third transistors to ground; and

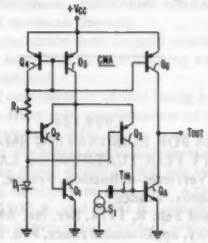
bias means coupled to said first, second, and third transistors for supplying bias operating potentials thereto or operating said cascode stage as a common emitter feeding a common base amplifier with its gain controlled by the constant current source whereby said third transistor provides an alternate current path for said constant current source and thereby provides said cascode stage with a large signal handling capability.

3,999,140

BIAS CURRENT CIRCUIT

Jonathan Samuel Radovsky, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,767
Int. Cl.² H03F *3/04*
U.S. Cl. 330—22 **6 Claims**



1. In combination:

a first, bipolar transistor of a first conductivity type, said first transistor having base and collector electrodes between which a current gain of amplitude h_{fe} is exhibited and having an emitter electrode;

means connecting the emitter electrode of said first transistor to a point of fixed potential for referring the emitter potential of said first transistor to said fixed potential;

second and third transistors of a second conductivity type complementary to said first conductivity type, each of said second and third transistors having a principal output current conducting path between first and second electrodes thereof and having a control electrode controllable in reference to its said first electrode, said second and third transistors exhibiting effective transconductances proportional to each other;

means for maintaining substantially-equal potentials at the control electrodes of said second and third transistors;

means for maintaining substantially equal potentials at the first electrodes of said second and third transistors;

means for supplying a prescribed current to the collector electrode of said first transistor;

means applying collector-to-base feedback to said first transistor for adjusting its emitter-to-base potential to condition said first transistor to conduct at least a portion of said prescribed current, including a direct coupling from the collector electrode of said first transistor to the first electrode of said second transistor, and including a direct coupling from the second electrode of said second transistor to the base electrode of said first transistor; and

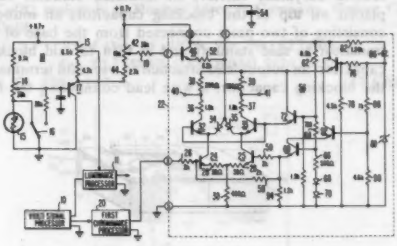
means for utilizing the current flowing through the second electrode of said third transistor, said current being substantially inversely proportional to h_{fe}.

3,999,141

CONTROLLABLE GAIN SIGNAL AMPLIFIER

Larry Allen Cochran, Indianapolis, Ind., and Leopold Albert Harwood, Somerville, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,489
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **7 Claims**



1. A controllable gain signal amplifier comprising:

at least first, second and third semiconductor devices coupled in a differential signal amplifying configuration, said first device conducting operating current for said second and third devices, at least said first and second devices exhibiting a current gain parameter β;

a signal input terminal coupled to said signal amplifying configuration;

a gain control terminal coupled to said signal amplifying configuration;

a signal output terminal coupled to said signal amplifying configuration;

gain controlling means coupled to said gain control terminal for varying the amplitude of direct current flow through at least said second device, said gain controlling means comprising:

a source of direct voltage;

a variable voltage divider coupled across said source and having an output terminal at which a selected portion of said voltage is provided;

coupling means including a voltage follower transistor exhibiting a current gain parameter similar to that of said devices and further having input and output electrodes, means direct current coupling said output electrode to said gain control terminal to apply gain control signals thereto, and means direct current coupled from said output terminal of said voltage divider to said input electrode of said follower transistor for varying said gain control signals supplied to said control terminal so as to compensate for differences in said parameter from a nominal condition.

3,999,142

VARIABLE TUNING AND FEEDBACK ON HIGH POWER MICROWAVE TRANSISTOR CARRIER AMPLIFIER

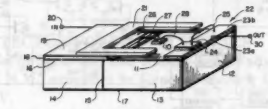
Adolph Presser, Kendall Park, and Edward Mykietyn, W. Windsor, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

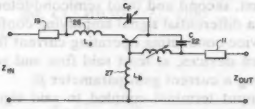
Filed Nov. 12, 1975, Ser. No. 631,245
Int. Cl.² H03F *3/04;* **H01L** *27/02*
U.S. Cl. 330—31 **2 Claims**

1. An improved transistor amplifier circuit of the common base type:

having a bottom metallic film, a beryllium carrier constructed of two parts bonded together along a metallic bead, said carrier mounted on the bottom metallic film, a first top metallic film placed on top of the first part of the beryllium carrier and extending over a portion of the second beryllium carrier, and a second top metallic film

separated from the first top metallic film and positioned on top of the second beryllium carrier and having a transistor chip arranged in the common base configuration mounted on said metallic film, a dielectric material mounted over the first metallic film, a metallic layer placed on top of said dielectric film with an input lead attached to said metallic layer, a blocking capacitor placed on top of the metallic film which extends over the second beryllium carrier, an insulated standoff being placed on top of the blocking capacitor, an inductor consisting of two parts connected from the base of the transistor to said standoff and in turn to said blocking capacitor, an output lead attached to a second terminal of the blocking capacitor, a wire lead connecting the first





metallic film to the emitter terminal of the transistor chip, a second wire connecting the base terminal of the transistor chip to the first top metallic film, wherein the improvement comprises in combination with the common base transistor amplifier chip a flat, thin, bendable, selectively positioned U-shaped metallic bracket with a base and two prongs, with the base of the U portion of the bracket attached to the top metallic portion of the input transmission line and the first and second prong of the U bracket extending above and placed in close proximity to the second top metallic film, said prongs moveable in the space between the input and output transmission line whereby said prongs extending above the said metallic film form a variable tuning and feedback capacitor.

3,999,143

PULSE WIDTH MODULATED SIGNAL AMPLIFIER

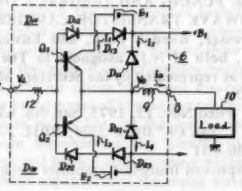
Tadao Yoshida, and Tadao Suzuki, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 16, 1975, Ser. No. 641,243

Claims priority, application Japan, Dec. 20, 1974, 49-146424

Int. Cl.² H03F 3/38

U.S. Cl. 330—207 A 10 Claims



1. A pulse width modulated signal amplifier comprising:

A. a DC power source having first and second terminals;

B. first and second transistors each having a base, an emitter, and a collector, each of said bases being supplied with a pulse width modulated signal to be amplified and said emitters being connected together at a common connection point;

C. an output terminal connected to said emitters;

D. a load;

E. a low pass filter connecting said output terminal to said load;

F. first connecting means connecting the first terminal of said DC power source to the collector electrode of said first transistor;

G. second connecting means connecting the second terminal of said DC voltage source to the collector electrode of said second transistor;

H. first and second diodes, said first diode being connected between the first terminal of said DC power source and the common emitter connection point of said first and second transistors and said second diode being connected between the second terminal of said DC power source and said common emitter connection point; and

I. first and second voltage limiting means, said first voltage limiting means being connected between the base electrode of said first transistor and the first terminal of said DC power source, said second voltage limiting means being connected between the base electrode of said second transistor and the second terminal of said DC power source, whereby said first and second transistors are free from a longitudinal amplitude distortion in response to their switching operations.

3,999,144

PROCESS FOR ELIMINATING SMALL-SCALE INTENSITY FLUCTUATIONS OF LASER BEAMS

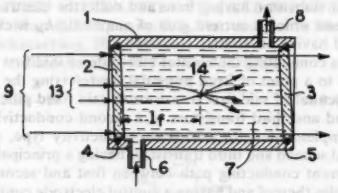
Georges Bret, Verrieres-le-Buisson, France, assignor to Quantel S.A., Vigneux, France

Filed Feb. 8, 1974, Ser. No. 440,866

Claims priority, application France, Feb. 8, 1973, 73.04503; Feb. 8, 1973, 73.04504

Int. Cl.² H01S 3/13

U.S. Cl. 331—94.5 N 8 Claims



1. A method for eliminating small-scale, spatial intensity fluctuations in laser beams, comprising the steps of placing in the path of the laser beam at least one nonlinear filtering element constituted by a fluid medium having an index of refraction increasing with the intensity of light passing through the fluid medium; and focussing only the laser small-scale, spatial intensity fluctuations above a power threshold determined by

$$P\,(threshold) = \frac{C}{8\pi}\,\pi R^2 n_0 \left|E\right|^2 = \frac{(1.22\gamma)^2 C}{512\,n_2}$$

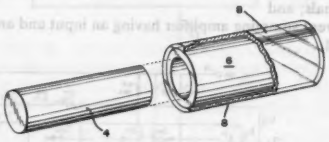
at a focal point within said fluid medium whereby the energy contained in said small-scale, spatial intensity fluctuations is dissipated and therefore eliminated from said laser beam.

3,999,145

OPTICAL CONVERTOR FOR LASER SYSTEMS

John J. Gilman, Convent Station, and Richard C. Ropp, Warren, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 485,196, July 2, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,891
Int. Cl.² H01S 3/091
U.S. Cl. 331—94.5 P 9 Claims



7. A method for increasing the efficiency of a laser system comprising:

combining convertor ions selected from the group consisting of trivalent dysprosium and trivalent samarium in a crystalline convertor host for said convertor ions, said convertor host being selected from the group consisting of yttrium orthovanadate, yttrium phosphate, yttrium arsenate, yttrium chromate, gadolinium orthovanadate, gadolinium phosphate, gadolinium arsenate, gadolinium chromate and mixtures thereof;

arranging said convertor host in said resonant cavity together with a laser host in which lasing neodymium ions have been combined;

maintaining said combination of said lasing ions in said laser host separate from said combination of said convertor ions in said convertor host; and

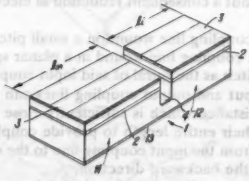
converting input electromagnetic radiation having a wavelength less than about 4,000 A. and not readily absorbed by said lasing neodymium ions to a wavelength of between about 5500 A. and 8500 A., which approximately matches an excitation wavelength of said lasing neodymium ions.

3,999,146

SEMICONDUCTOR LASER DEVICE

Roy Lang, and Kohroh Kobayashi, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,810
Claims priority, application Japan, Aug. 23, 1974, 49-96737; Dec. 27, 1974, 50-1863; Jan. 16, 1975, 50-8229[U]; Jan. 17, 1975, 50-8050; Jan. 17, 1975, 50-8701[U]
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 M 4 Claims



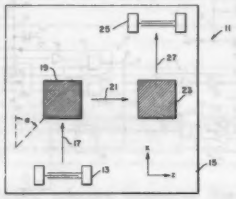
1. A pulse-modulatable semiconductor laser device comprising: a modulatable semiconductor laser element with a laser cavity exhibiting a steady state and an oscillating state in response to an applied pulse-modulated current signal, and an external light source disposed outside of said cavity and emitting a light beam including substantially the same wave length as that of an output light beam generated in said oscillating state; wherein said external light source is so oriented as to inject a light beam of a predetermined intensity into the active region of said laser element when said laser element is placed in said oscillating state in response to said current signal, thereby to suppress spiking oscillator of the output light of said laser element in the intensity waveform on the time axis.

3,999,147

TEMPERATURE STABLE SURFACE ACOUSTIC WAVE AND OSCILLATOR USING THE DEVICE

Oberdan W. Otto, and Rolf D. Weglein, both of Los Angeles, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 31, 1975, Ser. No. 627,801
Int. Cl.² H03B 5/32; H03H 9/20, 9/26
U.S. Cl. 331—107 A 17 Claims



1. A temperature stable surface acoustic wave device, comprising:

a substrate of material capable of supporting propagating surface acoustic wave energy in two directions in which the temperature coefficients of delay are of opposite sign;

input means including an input transducer disposed on said substrate for converting input electromagnetic energy to surface acoustic wave energy in said substrate and for causing said surface acoustic wave energy to propagate in one of said directions;

output means including an output transducer disposed on said substrate for converting surface acoustic wave energy incident thereon to output electromagnetic energy; and

reflective grating means disposed on said substrate for reflecting surface acoustic wave energy from said input transducer propagating in said one of said directions to the other of said directions, and for directing said surface acoustic wave energy toward said output transducer, the path lengths of said surface acoustic wave energy propagating along said directions being predetermined to provide a total linear zero temperature coefficient of delay in said device.

9. A temperature stable surface acoustic wave feedback oscillator, comprising:

a substrate of material capable of supporting propagating surface acoustic wave energy in two directions in which the temperature coefficients of delay are of opposite sign;

input means including an input transducer disposed on said substrate for converting input electromagnetic energy to surface acoustic wave energy in said substrate and for causing said surface acoustic wave energy to propagate in one of said directions;

output means including an output transducer disposed on said substrate for converting surface acoustic wave energy incident thereon to output electromagnetic energy;

reflective grating means disposed on said substrate for reflecting surface acoustic wave energy from said input transducer propagating in said one of said directions to the other of said directions, and for directing said surface acoustic wave energy toward said output transducer, the path lengths of said surface acoustic wave energy propagating along said directions being predetermined to provide a total linear zero temperature coefficient of delay;

amplifier means having an input circuit coupled to said output transducer and having an output circuit coupled to said input transducer to define a feedback path including said propagating surface acoustic wave energy; and

oscillator output means coupled to said feedback path for providing an output signal from said oscillator.

3,999,148

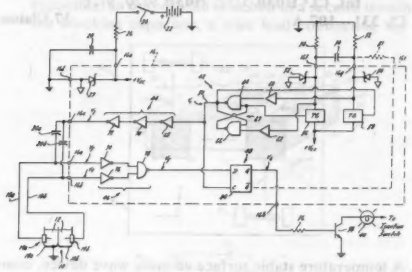
OSCILLATOR CIRCUIT

Frederick Otto Richard Miesterfeld, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 520,581, Nov. 4, 1974. This application Sept. 22, 1975, Ser. No. 615,438

Int. Cl.² H03K *3/08*

U.S. Cl. 331—143 **3 Claims**



1. An on-off type oscillator circuit wherein the on time is a function of the RC time constant of a capacitor and a resistor and the off time is a function of the RC time constant of said capacitor and a second resistor, said circuit comprising in combination with said capacitor and said resistors:

a D. C. power supply;

a transmission gate having its controlled conduction path connecting said first-mentioned resistor across said power supply;

a second transmission gate having its controlled conduction path connecting said second resistor across said power supply;

means connecting said capacitor between the junction of said first resistor and of said first transmission gate and the junction of said second resistor and of said second transmission gate;

limiting means connected at said first-mentioned junction to limit the potential thereof to a predetermined value;

a second limiting means connected at said second junction to limit the potential thereof to a given value;

a flip-flop having a pair of inputs and a pair of outputs;

means connecting one of said flip-flop inputs to said first junction;

means connecting the other of said flip-flop inputs to said second junction;

means connecting one of said flip-flop outputs to the control input of said first transmission gate; and

means connecting the other of said flip-flop outputs to the control input of said second transmission gate.

3,999,149

MODULATION SYSTEM

Dale M. Uetrecht, Colerain Township, Hamilton County, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio

Filed June 20, 1975, Ser. No. 588,628

Int. Cl.² G10H *1/02*

U.S. Cl. 332—17 **4 Claims**

1. A modulating system for an electronic musical instrument comprising:

a first transistor and a second transistor forming a pair of transistors, said transistors having a base, emitter, and collector, said first and second transistors having their emitters connected together;

a source of audio current signals connected to the emitters of said first and second transistors;

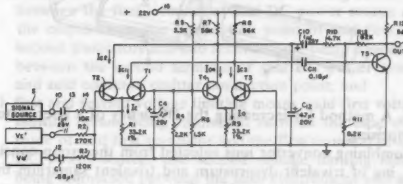
a first resistor connecting the emitters of said first and second transistors to ground;

a first source of essentially fixed DC bias voltage connected to the base of said first transistor;

a second source of DC bias voltage connected to the collectors of said first and second transistors;

a source of control voltage connected to the base of said second transistor, said control voltage having an AC modulating voltage component and a DC modulating voltage component for modulating the audio current signals; and

a current summing amplifier having an input and an output; and



collector means for connecting the collectors of said first and said second transistors to the input of said current summing amplifier so that said control voltage modulates the percentage of said audio current signals reaching the output of said current summing amplifier over a wide dynamic range, and so that the percentage of said audio current signal reaching the output of said current summing amplifier is further modulated by said AC modulating voltage component causing the percentage of audio current signal modulated by said AC modulating voltage component to remain essentially constant over said wide dynamic range, and the amount of AC modulating voltage reaching the output of said summing amplifier is reduced by cancellation.

3,999,150

MINIATURIZED STRIP-LINE DIRECTIONAL COUPLER PACKAGE HAVING SPIRALLY WOUND COUPLING LINES

Edward S. Caragliano, Poughkeepsie, and Howard H. Nick, LaGrangeville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,256

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H01P *5/18*

U.S. Cl. 333—10 **9 Claims**

1. A strip-line directional coupler having a smaller volumetric size without a consequent reduction in electrical operation comprising;

an input coupling line wound in a small pitch planar spiral;

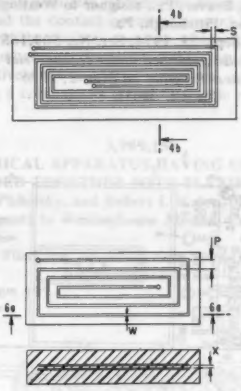
an output coupling line wound in a planar spiral having the same pitch as the spiral of said input coupling line so that said input and output coupling lines can be located at a fixed distance which is sufficiently close to one another along their entire length to provide coupling of an input signal from the input coupling line to the output coupling line in the backward direction;

a first and second ground plane located one on either side of a small distance from said spirally wound input and output coupling lines;

a dielectric material located between said input and output lines and between said ground planes and said input and output lines;

the spirally wound input and output coupling lines having sufficiently small pitch to provide electro-magnetic coupling between adjacent windings of the spirals to obtain improved electrical characteristics so as to enable a re-

duction of spacing of said first and second ground planes from either side of said spirally wound input and output



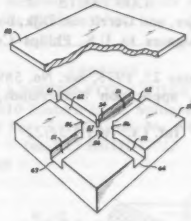
coupling lines thereby offsetting the improved electrical characteristics and, thereby further diminishing the volumetric size of said device into a small flat package.

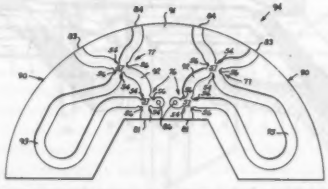
3,999,151

CROSSGUIDE HYBRID COUPLER AND A COMMUTATING HYBRID USING SAME TO FORM A CHANNEL BRANCHING NETWORK

Wiley M. Baldwin, Kingston, N.H.; Hans A. Kvinlaug, Bradford; Han-Chiu Wang, Andover, both of Mass., and William C. Young, Eatontown, N.J., assignors to Western Electric Company, Inc. and Bell Telephone Laboratories, Incorporated, both of New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,586
Int. Cl.² H01P *5/16, 5/18*
U.S. Cl. 333—10 **11 Claims**





1. A rectangular waveguide hybrid coupler, which comprises:

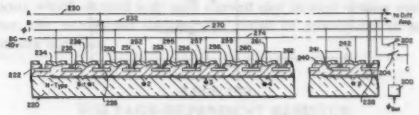
first and second rectangular waveguide paths intersecting to form a coupling region having two pairs of opposed corners, at least one of the pairs of opposed corners projecting into the coupling region and the other pair of opposed corners being shaped to form a pair of opposed walls which are substantially parallel to each other and to the pair of projecting corners.

3,999,152

CCD SELECTIVE TRANSVERSAL FILTER

Robert N. Sato, Gardena, and Paul R. Prince, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 21, 1974, Ser. No. 516,832
Int. Cl.² G11C *19/28;* **H03H** *7/28, 7/30*
U.S. Cl. 333—70 T **13 Claims**



9. A charge coupled selective transversal filter having a plurality of split electrodes and a plurality of continuous electrodes positioned along the surface of a substrate and responsive to a plurality of sequential input signals comprising:

single phase clocking means coupled to selected ones of said electrodes for transferring charges along said substrate;

first and second leads respectively coupled to opposite ends of said split electrodes;

differential means coupled to said first and second leads;

readout means coupled to said differential means for periodically providing a readout signal each representing one of said pluralities of input signals; and

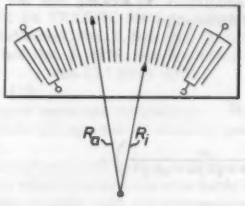
a source of switched DC current coupled to said first and second leads for providing a reference bias thereto prior to development of each readout signal.

3,999,153

ACOUSTIC SURFACE WAVE FILTER

Manfred Börner, Ulm, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed July 22, 1975, Ser. No. 598,023
Claims priority, application Germany, July 25, 1974, 2435751
Int. Cl.² H03H *9/26, 9/32, 9/02;* **H01L** *41/10*
U.S. Cl. 333—72 **9 Claims**



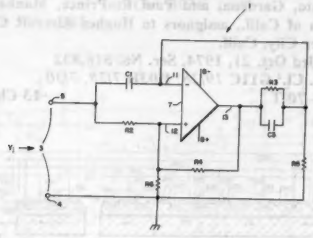
9. An acoustic surface wave filter comprising a member stimulable to surface oscillation, first means associated with said member for converting electrical energy into mechanical energy, second means associated with said member for converting mechanical energy into electrical energy and a plurality of disturbance locations on a surface of said member in the form of a line grating with spacings between adjacent lines of said grating of varying size in the longitudinal direction of said lines, at least over part of the length of said lines.

3,999,154

NETWORK WITH SINGLE AMPLIFIER FOR SIMULATING FDNR CIRCUIT

Charles E. Schmidt, Woodside, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 24, 1975, Ser. No. 644,281
Int. Cl.² H03H 7/44
U.S. Cl. 333—80 R 10 Claims



1. An active one-port network for simulating the parallel combination of an FDNR D, a capacitor C, and a resistor R electrically connected in series across the pair of terminals of the network port, comprising:

a differential-input operational amplifier having first and second input lines electrically connected to associated input terminals of the amplifier which are of opposite polarity and having an output line;

a capacitor C1 electrically connected between one network terminal and said first input line;

a resistor R2 electrically connected between the one terminal and said second input line;

the parallel combination of a resistor R3 and capacitor C3 electrically connected between said output line and said first input line;

a resistor R4 electrically connected in series between said output line and said second input line;

a resistor R5 electrically connected between said first input line and the other network terminal which is also connected to a ground reference potential; and

a resistor R6 electrically connected between said second input line and ground;

normalized values of the capacitances of said capacitors being unity;

normalized values of the resistances of said resistors satisfying the requirement that

$$g4 = g2 + g6,$$

where g represents the conductance of a particular one of said resistors, the admittance Y_i looking into the network port satisfying the relationships

$$Y_i = s^2D + sC + G$$

$$= s^2\left(\frac{g6}{g2\,g3 + g3\,g6 - g4\,g5}\right) +$$

$$s\left(\frac{g2\,g6 + g3\,g6 - g4\,g5}{g2\,g3 + g3\,g6 - g4\,g5}\right)$$

$$+ \frac{g2(g3\,g6 - g4\,g5)}{g2\,g3 + g3\,g6 - g4\,g5}$$

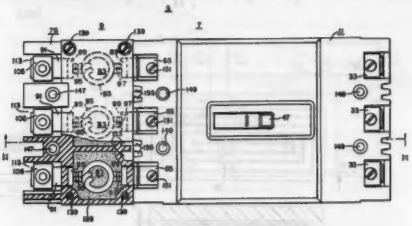
where the symbols D, C, and 1/G represent the values of the FDNR, capacitor, and resistor, respectively, simulated across the network port.

3,999,155

CIRCUIT INTERRUPTER INCLUDING A CURRENT-LIMITING REACTOR

James C. Wilson, Beaver, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1974, Ser. No. 509,165
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976
Int. Cl.² H01H 83/00
U.S. Cl. 335—7 8 Claims



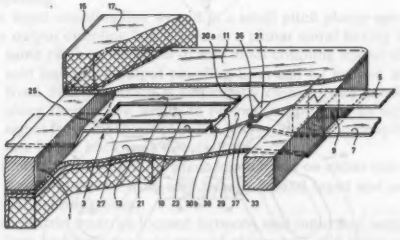
1. A circuit interrupter having a peak let-through current under sudden severe overcurrent conditions, comprising a circuit breaker having separable contacts, and current-limiting reactor means connected in series circuit relationship with said circuit breaker; said current-limiting reactor means comprising an insulating housing having a compartment formed therein, a coil of conductive material supported within said housing and electrically connected in series circuit relationship with contacts of said circuit breaker, and electrically insulating thermally conducting filler material surrounding said coil and occupying the volume of said compartment; said current-limiting reactor means being connected to said circuit breaker during both normal and overcurrent conditions and limiting the peak let-through current during overcurrent conditions to a value which can be safely interrupted by said circuit breaker.

3,999,156

BISTABLE MAGNETIC SWITCH COMPRISING STRIP CONTACTS

Jan Paul Steenmeijer, and Gerrit van Dijk, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,339
Claims priority, application Netherlands, July 2, 1974, 7408907
Int. Cl.² H01H 51/22
U.S. Cl. 335—79 8 Claims



1. A bistable switch comprising a strip-shaped contact member of magnetically and electrically conductive material which is clamped near a first end, a second, freely movable end thereof being arranged between and brought alternatively into contact with one of two permanently arranged magnetically

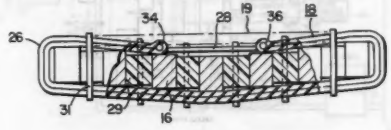
and electrically conductive counter-contacts by means of an externally generated magnetic flux, said counter contacts forming part of the magnetic flux path of a permanent hold magnet, which path also includes the free end of the contact member and the contact openings present between the said free end and the counter-contacts, characterized in that the contact member comprises a bending-resistant portion, having a comparatively low magnetic resistance, and a flexible portion having a comparatively high magnetic resistance.

3,999,157

ELECTRICAL APPARATUS HAVING CONDUCTORS BANDED TOGETHER WITH FLEXIBLE BELTS

Harold M. Philofsky, and Robert L. Kolek, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 15, 1975, Ser. No. 541,367
Int. Cl.² H01F 17/00
U.S. Cl. 336—197 **8 Claims**



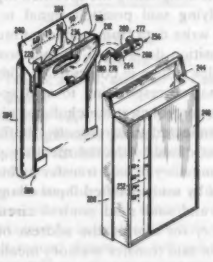
1. Electrical apparatus comprising:
a plurality of substantially parallel winding conductors;
a resilient and flexible member reinforced with non-metallic cords of twisted strands, said flexible member having two ends and being disposed around a portion of at least two of said conductors; and,
means for connecting the ends of said flexible member together to develop a tensile stress in the resilient and flexible member which forces said conductors together, said means for connecting the ends together comprising a rigid, non-metallic member constructed of a plurality of resin impregnated layers of a fibrous cloth material, said rigid member having at least two openings therein, and non-metallic rods positioned through loops at the end of the flexible member, with the rods extending into the openings in the rigid member.

3,999,158

RANGE LIMITER FOR A THERMOSTAT

James T. Rae, 4810 Eastern Lane, Suitland, Md. 20023

Filed Feb. 5, 1975, Ser. No. 547,370
Int. Cl.² H01H 37/12
U.S. Cl. 337—360 **2 Claims**



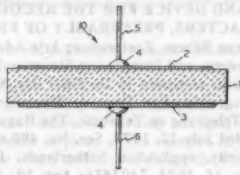
1. The thermostat having an ambient temperature responsive element, a switch mechanically coupled to said temperature responsive element for control thereby so as to cause reverse switch operations above and below a temperature setting, means for controlling the relationship between said switch and said temperature responsive element to establish a desired temperature, said temperature resonsive element including a manually operable thermostat setting member, support means including a removable cover, said manually operable thermostat setting member protruding through said support or said cover and being an elongated straight member, pivotally mounted on the end portion away from the end portion extending through said support or said cover and having a curved slot therein which lies on an arc having the pivot point as its center, wherein a front plate, located in front of said setting member, is mounted on said support means and has a curved slot therein that is aligned with said curved slot in said setting member, and said range limiter being a plate removably mounted, after said cover is removed, in said curved slot in said front plate and having two extension portions which extend into said curved slot in said setting member, the extensions limiting the range of movement of said setting member.

3,999,159

VOLTAGE-DEPENDENT RESISTOR

Mikio Matsuura; Nobuji Nishi, both of Hirakata; Michio Matsuoka, Ibaragi, and Takeshi Masuyama, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 2, 1975, Ser. No. 564,628
Claims priority, application Japan, Apr. 5, 1974, 49-39099
Int. Cl.² H01C 7/12
U.S. Cl. 338—21 **6 Claims**



1. A voltage-dependent resistor of bulk-type comprising a sintered body consisting essentially of zinc oxide (ZnO), as a main constituent, and, as additives, 0.1 to 5.0 mole percent of bismuth oxide (Bi_2O_3), 0.01 to 5.0 mole percent of gallium oxide (Ga_2O_3), at least one member selected from the group consisting of 0.1 to 3.0 mole percent of cobalt oxide (CoO) and 0.1 to 3.0 mole percent of manganese oxide (MnO), and electrodes applied to opposite surfaces of said sintered body.

3,999,160

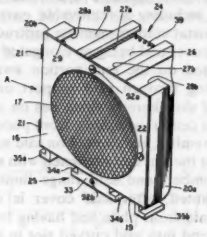
MODULAR TRAFFIC SIGNAL APPARATUS

Richard M. McDonnell, Rte. 5, Box 360, Decatur, Ala. 35601

Filed Dec. 5, 1975, Ser. No. 638,273
Int. Cl.² E01F 9/00
U.S. Cl. 340—119 **9 Claims**

1. Traffic signal apparatus comprising:
a signal module having a pair of mutually spaced apart wall members;
each of said wall members having mechanical interconnective means which is selectively attachable in mechanical interlocking relation with complementary interconnective means of another signal module;
electrical circuit connective means associated with each said interconnective means and operative to establish a plurality of predetermined electrical circuit interconnections with complementary circuit connective means of said other signal module upon attachment therewith;
electrical bus means extending between said circuit connective means associated with each of said mechanical interconnective means; and

lamp means disposed in said signal module and operative to establish an electrical circuit between said lamp means and a selected circuit of said electrical bus means, so that



a plurality of said signal modules can be interconnected to provide an electrically interconnected prewired traffic signal array.

3,999,161

METHOD AND DEVICE FOR THE RECOGNITION OF CHARACTERS, PREFERABLY OF FIGURES

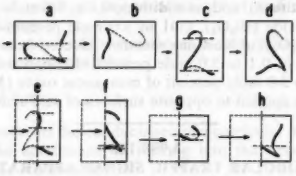
Jan Frederik van Bilzem, Zoetermeer; Arie Adriaan Spanjersberg, Leiderdorp, and Joannes van Staveren, Zoetermeer, all of Netherlands, assignors to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands

Filed July 22, 1974, Ser. No. 490,653

Claims priority, application Netherlands, July 30, 1973, 7310524; Mar. 15, 1974, 7403516; Apr. 19, 1974, 7405344

Int. Cl.² G06K 9/12

U.S. Cl. 340—146.3 AC 19 Claims



1. In a character reading device having a matrix store for storing the lines consisting of marks corresponding optically to that character read and having a processor for processing the information detected from said matrix, the improvement comprising:

A. means for manipulating said marks in said matrix store including separate means for copying and for rotating said marks in a rectangular matrix,

B. means for scanning predetermined parts of said rectangular matrix including separate means for determining the location and number of the discontinuities, slopes and terminal points in the lines of said marks in each scanned part of said rectangular matrix, and

C. means for forming a secondary image of the marks in said rectangular matrix including means for determining the number and borders of islands formed by said secondary image when said rectangular matrix is successively scanned from each of its four sides.

3,999,162

TIME-DIVISION MULTIPLEX SWITCHING CIRCUITRY

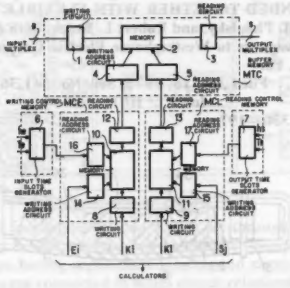
Guy Le Roy, Lannion, France, assignor to Societe Lannionnaise d'Electronique Sle-Citerel and Compagnie Industrielle des Telecommunications Cit-Alcatel, both of, France

Filed Sept. 20, 1971, Ser. No. 181,953

Claims priority, application France, Sept. 18, 1970, 70.33980; Feb. 11, 1971, 71.04655

Int. Cl.² G06F 3/00

U.S. Cl. 340—172.5 2 Claims



1. Switching circuitry for transferring data from a specified input channel occupying a selected one of a plurality of time slots of an input time-division multiplex system to a specified output channel occupying a selected one of a plurality of time slots of an output time-division multiplex system comprising transfer memory means including a plurality of buffer memories each connected to receive a respective input time-division multiplex system and having a plurality of memory positions and being responsive to a position signal for writing incoming data from an input channel of an input time-division multiplex system into a selected buffer memory in a selected memory position thereof designated by said position signal and for transferring the data from said selected memory position to an output channel of a single output time-division multiplex system; input time slot generator means including a plurality of input time slot generators and output time slot generator means including a single output time slot generator for generating respective sets of time slot signals corresponding to the time slots of the input and output time-division multiplex systems, respectively; control circuit means including a write control circuit connected to said input time slot generator means and a read control circuit connected to said output time slot generator means and responsive to a position signal and a pair of signals designating the specified input and output channels for applying said position signal to said transfer memory means to write data from said input multiplex system into a memory position designated by said position signal to said output multiplex system in coincidence with generation of the time slot signal corresponding to said specified output channel, said write control circuit including a plurality of write memories each connected to a respective buffer memory for storing the address of said selected memory position in the associated buffer memory of said transfer memory means in a time slot occupied by said specified input channel of an input multiplex system and said read control circuit including a single read memory for storing the address of said selected memory position in said transfer memory means in a time slot occupied by said specified output channel in an output multiplex system; and distribution means for sequentially connecting said single read memory to said transfer memory means in control of said plural buffer memories.

3,999,163
SECONDARY STORAGE FACILITY FOR DATA PROCESSING SYSTEMS

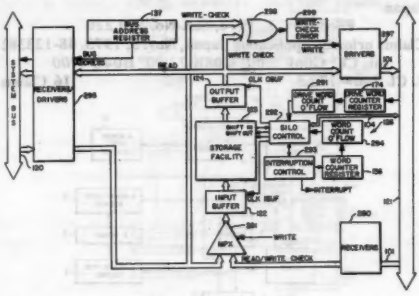
John V. Levy, Maynard; Steven R. Jenkins, Medford; Victor Ku, Westboro; Peter McLean, Stow, and Thomas N. Hastings, Arlington, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 10, 1974, Ser. No. 432,140

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **32 Claims**



1. A secondary storage facility for a data processing system comprising:

A. a controller connected to the system including

i. control circuit means for generating address signals and for generating and receiving control signals and control information signals, and

ii. controller data transfer means for receiving or transmitting data and control signals,

B. a drive for storing digital data including

i. data storage means,

ii. drive control circuit means for receiving address signals and for receiving and generating control signals and control information signals to effect with said control circuit means in said controller an asynchronous transfer of the control information signals,

iii. drive data transfer means for storing data in or retrieving from said data storage means synchronously, said transfer means being coupled to said drive control circuit means to select said drive for a data transfer,

C. asynchronous bus means for interconnecting said control circuit means in said controller and said drive, said asynchronous bus means including address, control and control information conductor means, and

D. synchronous bus means for interconnecting said controller and drive data transfer means, said synchronous bus means including control and data conductor means.

3,999,164
PRINTING DEVICE

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 12, 1975, Ser. No. 576,652

Claims priority, application Japan, May 13, 1974, 49-52265

Int. Cl.² G06F *3/12;* **G06C** *23/06*

U.S. Cl. 340—172.5 **9 Claims**

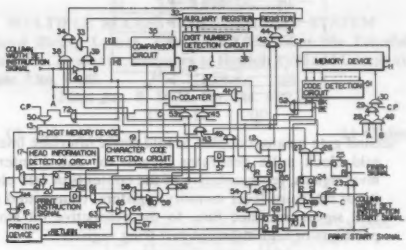
1. A printing device for printing on a recording paper a plurality of unit record data, each unit record data comprising a plurality of data words, in such a tabulation that the word of each of the unit record datum are printed in respective columns so as to form a line and so as to be vertically aligned with the word data of another unit record data to be printed in the same column, the printing device comprising:

data memory means for storing coded information comprised of a plurality of unit record data serially arranged with record positioning codes interposed therebetween and with no space therebetween, each unit record data comprising word data each including a spontaneous number of digits and serially arranged with word positioning codes interposed among them;

counter means coupled to said data memory means for counting the number of digits of each of said word datum as the unit record data are read out from said data memory means one after another;

column width memory means coupled to said counter means for storing the number of digits of each of the word datum of any of said unit record datum, which have been counted by said counter means and which define the width of the column on the recording paper in which the word datum is to be printed;

comparator means coupled to said column width memory means for comparing the number of digits of each of said word datum in any unit record datum, which is stored in



said column width memory means, with that of the word datum in the next unit record datum to be printed in the same column;

column width-rewriting means coupled to said column width memory means for writing into said column width memory means in place of the number of digits of each word datum in any unit record datum the number of digits of the word datum in the next unit record data to be printed in the same column if the latter is found by said comparator means to be larger than the former; and

printing means coupled to said data memory means and to said column width memory means for printing unit data records in columns on the recording paper;

whereby each column width is determined automatically according to the largest number of digits which has been detected by said comparator means among the word data of the unit record data to be printed in the same column and which has been last written into said column width memory means by said column width-rewriting means.

3,999,165
INTERRUPT INFORMATION INTERFACE SYSTEM

Yuzo Kita, and Kazuo Watanabe, both of Kokubunji, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 27, 1973, Ser. No. 391,844

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

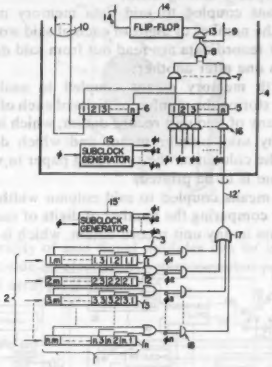
Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **8 Claims**

1. In an interrupt information interface system for delivering interrupt signals to a computer, said computer including an interrupt receiving register having a prescribed bit storage capacity for receiving respective interrupt signals from a plurality of interrupt level memory registers, the number of which interrupt level memory registers is equal to the number of interrupt levels of said interrupt signals and corresponds to said prescribed bit storage capacity of said interrupt receiving register, the improvement comprising:

clock generator means for generating a series of clock pulses;

first gate means, coupled to said plurality of interrupt level memory registers and said clock generator means, for gating the contents of said interrupt level memory registers therefrom in accordance with said series of clock pulses over a single interface line to said computer; and



second gate means, coupled to said single interface line and said clock pulse generator means, for gating interrupt level signals, representative of the contents of said plurality of interrupt level memory registers, transmitted over said signal interface line, to the respective bit storage positions of said interrupt receiving register.

3,999,166

STATIC SEMICONDUCTOR STORAGE ELEMENT

Karl Goser, Munich, and Michael Pomper, Schliersee, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

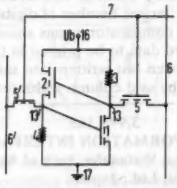
Filed Aug. 6, 1974, Ser. No. 495,185

Claims priority, application Germany, Aug. 14, 1973, 2341104; Aug. 6, 1973, 2339735

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² G11C *11/40, 13/00*

U.S. Cl. 340—173 FF **13 Claims**



1. A static storage element comprising a storage flip-flop with first and second interconnected branches, said first branch comprising a first field effect switching transistor and a first two-pole load element connected in series, said second branch comprising a second field effect switching transistor and a second two-pole load element connected in series, a supply voltage source connected to both of said branches, said first and second field effect transistors being formed with complementary conductivity, the sequence of connection of field effect switching transistor and load element of said second branch, relative to said voltage source, being the opposite of the sequence of connection of the field effect transistor and load element in said first branch, first connecting means for connecting the gate of said first field effect transistor with the node between the second field effect switching transistor and its associated load, and second connecting means for connecting the gate of said second field effect switching transistor with the node between said first field effect switching transistor and its associated load without intersecting with said first connecting means.

3,999,167

METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS

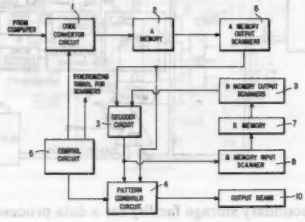
Masamichi Ito; Takashi Hirasaki, and Hiroshi Sato, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 1, 1974, Ser. No. 520,220

Claims priority, application Japan, Nov. 5, 1973, 48-123382

Int. Cl.² G06F *3/00;* **G08B** *23/00;* **H04Q** *1/00*

U.S. Cl. 340—172.5 **16 Claims**



1. Apparatus for reconstructing an original character pattern comprising an original matrix of $m \times n$ dots from a compressed character pattern comprising approximately $(m \times n)/2$ dots; said apparatus comprising

first memory means for storing said compressed character pattern as a compressed matrix of approximately $(m \times n)/2$ dots where each row of the compressed character pattern so contains every other dot of the corresponding row of the original character pattern that for each omitted dot of the original character pattern, the following dots of the original character pattern are stored in the first memory means: (a) a left dot disposed to the immediate left of each said omitted dot, (b) a right dot disposed to the immediate right of each said omitted dot, (c) an upper dot disposed immediately above each said omitted dot and (d) a lower dot disposed immediately below each said omitted dot;

decoder means responsive to said first memory means for restoring each said omitted dot to the original character pattern, said decoder means being responsive to the presence or absence of said left, right, upper and lower dots and at least one further dot in addition to said last-mentioned dots to generate a restored dot for each said omitted dot; and

combining means for combining the dots stored in said first memory means with said restored dots to thereby effect the reconstruction of said original character pattern.

3,999,168

INTERMIXED PITCHES IN A BUFFERED PRINTER

Gerald Ivan Findley, Morgan Hill; Kenneth Dean Cummings, and Teddy Lee Anderson, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,996

Int. Cl.² G06F *3/12, 7/32, 13/00*

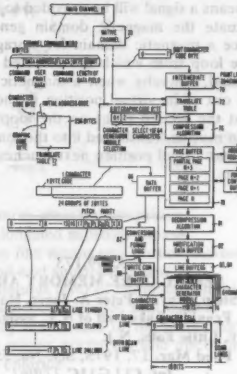
U.S. Cl. 340—172.5 **16 Claims**

1. An arrangement for printing characters of variable pitch, each of the characters being represented by a different segment of character data, comprising:

storage means;

means responsive to the character data for assembling the segments of character data in the storage means as a line to be printed;

means for storing a separate representation of desired character pitch for each of a plurality of the characters, the separate representation determining that one of a plurality of different possible pitches for the character at which the character is to be printed;



means responsive to the segments of character data arranged into a line for printing the characters represented by the segments of character data; and

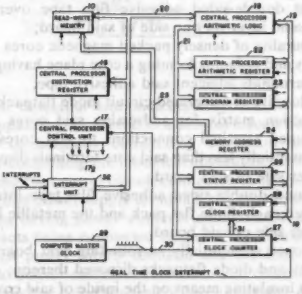
means associated with the means for printing and responsive to the separate representations of character pitch for providing each character in the line with the desired pitch independent of the pitches of other characters in the line as the character is printed.

3,999,169

REAL TIME CONTROL FOR DIGITAL COMPUTER UTILIZING REAL TIME CLOCK RESIDENT IN THE CENTRAL PROCESSOR

James A. Perschy, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 6, 1975, Ser. No. 538,656
Int. Cl.² G06F 9/18
U.S. Cl. 340—172.5 **5 Claims**



1. A system for providing real time clock control within the central processing unit of a programmed digital computer system having a read-write memory means operably connected by a plurality of input and output data flow paths to and from said central processing unit comprising, in combination,

a source of master clock pulses,

a clock counter means triggerable by said master pulse clock pulses for counting said clock pulses,

control means for selectively controlling said data flow paths in accordance with programmed instructions and being operably connected to said master clock pulse source, whereby said control means is synchronized with said clock counter means,

logic means operably interconnecting said memory means and said clock counter means for permitting said clock counter means to be preset to a selected counting state with reference instruction data from said memory means,

interrupt means operably connected to said control means to initiate an interrupt operation within said computer system, and

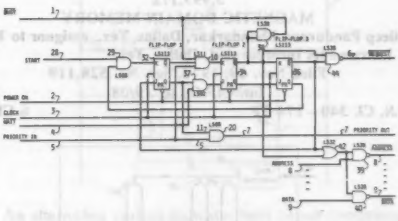
means operably connecting said clock counter means to said interrupt means for initiating an interrupt operation dependent upon the counting state of said clock counter means.

3,999,170

MULTIPLE ACCESS INTERCONNECT SYSTEM

Richard Ricker Lyman, Palo Alto, Calif., and Ole Eskedal, Ballerup, Denmark, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 8, 1975, Ser. No. 539,359
Int. Cl.² G11C 13/00
U.S. Cl. 340—173 R **11 Claims**



1. A system for interconnecting a plurality of units having means for transmitting information with at least one unit having means for receiving information, at least one of said units including means for generating a priority signal, comprising:

a bus for coupling the units;

means in each unit having means for transmitting information for generating a busy signal onto the bus in response to said unit transmitting information;

a sequencer having a first, second and third flip-flop;

an AND gate having inputs coupled to the bus for receiving the busy signal and the priority signal and coupled to an output of the first flip-flop for setting the second flip-flop in response to the busy signal and the priority signal both being at a selected logic state;

means for setting the third flip-flop in response to the output of the second flip-flop being at a selected logic state; and

means for resetting the first flip-flop.

3,999,171

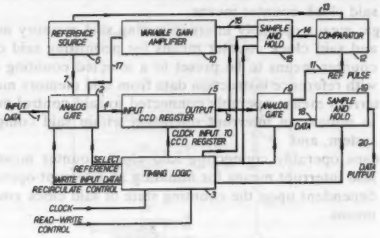
ANALOG SIGNAL STORAGE USING RECIRCULATING CCD SHIFT REGISTER WITH LOSS COMPENSATION

Robert Parsons, St. Neots, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 17, 1975, Ser. No. 632,871
Int. Cl.² G11C 19/18, 21/00, 27/00
U.S. Cl. 340—173 RC **14 Claims**

1. An analog signal storage system for a succession of analog signal samples including a multi-stage analog shift register, means for inputting signal samples into said shift register, means for propagating said signal samples along said shift

register from a first stage to a last stage thereof, controllable gain means connected in a signal path for the signal samples in series with said shift register, means for inputting a reference signal of predetermined magnitude to the first stage of said shift register and comparing means for comparing the reference signal after propagation through the shift register with said predetermined magnitude, means for applying an output of the comparing means to control the gain of said controllable gain means in a sense to tend to compensate for variations in signal amplitude caused by propagation through said shift register.

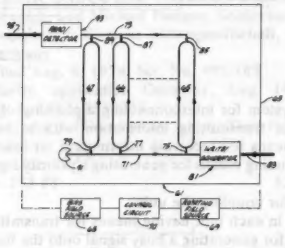


3,999,172

MAGNETIC DOMAIN MEMORY

Dileep Pandurang Bhandarkar, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 29, 1974, Ser. No. 528,119
Int. Cl.[2] G11C *19/08*
U.S. Cl. 340—174 TF 6 Claims



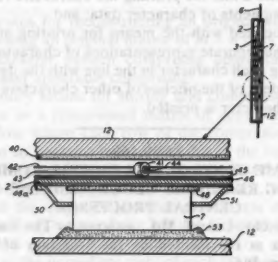
1. A magnetic domain memory comprising:
a layer of magnetic material in which magnetic domains can be moved;
means for causing the movement of magnetic domains within said material;
at least one closed memory storage loop for the storage and guided movement of magnetic domains therearound, each magnetic domain in said loop having a virtual position with respect to all other magnetic domains in said loop;
means for generating magnetic domains;
an input path for the movement of magnetic domains from the generating means to the memory storage loop;
means for detecting the presence of magnetic domains, said magnetic domain detection means including an output to provide a signal indicative of the detection of magnetic domains for desired information utilization;
an output path, separate from said input path, for the movement of magnetic domains from the memory storage loop to the magnetic domain detection means;
a first one-way gate at a first point on the loop for transferring magnetic domains from the input path into the memory storage loop;
a second one-way gate at a second point on the loop for transferring magnetic domains from the memory storage loop to the output path; and
control means synchronized with the movement of magnetic domains to selectively operate said first and second one-way gates and being responsive to the output of the magnetic domain detection means to actuate the magnetic domain generating means such that when a magnetic domain is detected by said magnetic domain detection means a signal will be provided to the control means to actuate the magnetic domain generating means to produce a magnetic domain for storage in the memory storage loop from which the detected magnetic domain originated, whereby when a magnetic domain is transferred out of its virtual position in the memory storage loop at the second point on the loop, a new magnetic domain may be transferred into the same virtual position when that virtual position next reaches the first point on the loop.

3,999,173

SERIAL CORE MEMORY ARRAY

Morris O. Stein, Wayne; Peter A. Jager, Haledon, and J. Fred Rathjen, Franklin Lakes, all of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Mar. 17, 1975, Ser. No. 559,315
Int. Cl.[2] G11C *11/061*
U.S. Cl. 340—174 MA 7 Claims

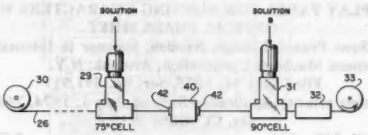


1. A memory array assembly comprising:
a. a printed circuit board having thin metallic layers overlaying the central portion of both sides of said board;
b. first double-sided adhesive film tape overlaying said metallic layer on one side of said board;
c. a plurality of densely packed magnetic cores arranged in rows and columns forming a core plane having a plurality of terminals adjacent said adhesive tape;
d. a plurality of integrated circuit diode flatpacks forming a selection matrix for addressing said cores and having grouped terminal connections to said cores which are substantially less than said core terminals disposed on the other side of said board;
e. second double sided adhesive film tape interposed between each diode flat pack and the metallic layer on the other side of said board;
f. a cover substantially surrounding said board with said array and diode flatpacks disposed thereon;
g. first insulating means on the inside of said cover adjacent said array; and
h. thermal conducting means filling the space between said cover and each diode flatpack, whereby said metallic layers will maintain a temperature gradient across said cores, said adhesive tape will prevent movement of said cores, said insulating means will shield said cores from vibrations and said thermal means will transfer heat from said array and said flatpacks to said cover.

3,999,174
DISCONTINUOUS CHROMIUM FILM FOR MEMORY ELEMENT

Emil Toledo, Newton; Marden H. Seavey, Jr., Westford, and Joseph P. McNamara, Hudson, all of Mass., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 614,826
Int. Cl.² G11C *11/02*
U.S. Cl. 340—174 PW **4 Claims**

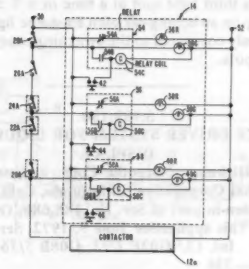


1. A plated memory element comprising:
non-magnetic elongated substrate means;
first permalloy film means or a portion thereof forming a layer around said substrate means;
a thin discontinuous layer of chromium chloride overlaying said magnetic permalloy film means
second permalloy film means or the remaining portion of said first film means overlaying said discontinuous layer of chromium chloride.

3,999,175
FAULT DETECTION INDICATION SYSTEM

Joseph C. Thibodeau, Box 393B, Rte. 38, Pelham, N.H. 03076

Filed July 31, 1975, Ser. No. 600,823
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 R **1 Claim**

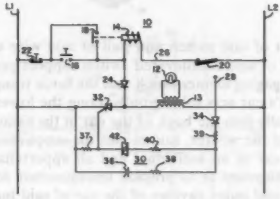


1. A fault detection and indication system for use with electrical apparatus connected to a control circuit comprising a plurality of normally conductive, condition responsive switches for controlling the electrical apparatus, the electrical apparatus and the control circuit connected in series between first and second power supply terminals, the condition responsive switches having power contacts and load contacts, the power contacts being connected to receive electrical current from the first power supply terminal and the load contacts connected to deliver electrical current to said electrical apparatus, the switches being separated into a plurality of sets of one or more switches, said system comprising a detection and indication circuit corresponding to each set of switches, each said circuit comprising:
A. first lamp means connected between the second power supply terminal and the load contact of the corresponding switch set,
B. normally conductive contact means,
C. second lamp means connected in series with said normally conductive contact means between the first and second power supply terminals, whereby said first and second lamp means are energized when the corresponding switch set is conductive,
D. latchable control means connected to said normally conductive contact means for latching open said normally conductive contacts, said control means connected between the second terminal of the power supply and the load contact of the corresponding switch set, and
E. reset switch means connected to the first terminal of the power supply and said control means for energizing said control means whereby actuating said reset switch means energizes its corresponding control means to open said normally conductive contact means thereby to de-energize said second lamp means, the subsequent opening said switch set energizing said second lamp means and de-energizing said first lamp means.

3,999,176
INDICATOR LIGHT CIRCUIT PROVIDING NORMAL AND EMERGENCY INDICATION

Walter J. Kellogg; Glenn R. Taylor, and Wardell Gary, all of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 7, 1975, Ser. No. 565,499
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 A **15 Claims**



1. An alternating current indicator light circuit comprising:
an indicator lamp;
first switch means switchable between an open position inhibiting current flow therethrough and a closed position permitting flow therethrough, said first switch means being disposed to energize said indicator lamp when in the closed position;
second switch means switchable in response to a trigger signal between an open position inhibiting current flow therethrough and a closed position permitting current flow therethrough, said second switch means being disposed to energize said indicator when in the closed position; and
timing means connected to said second switch means for triggering said second switch means to a closed position at periodic intervals when energized.

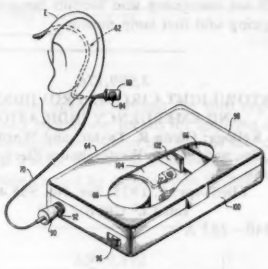
3,999,177
VEHICLE OPERATOR ALERT SENSOR AND ALARM

Harold L. Greene, 44 Rock Ridge Road, Dover, N.J. 07801

Continuation-in-part of Ser. No. 401,357, Sept. 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 323,831, Jan. 15, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,488
Int. Cl.² G08B *21/00*
U.S. Cl. 340—279 **9 Claims**

1. Alarm apparatus comprising a power source, an alarm, a switch, means electrically coupling said source, said alarm and said switch for actuating said alarm in response to actuation of said switch, means for supporting said switch from the ear of an individual for movement with the individual's head including an ear engaging element formed of a resilient material and having a portion arcuately shaped to engage over and behind

an individual's ear, said arcuately shaped portion lying in a plane which is substantially vertical when said element is mounted on the ear of an individual whose head is upright, said element also having an elongated switch support portion cantilevered from adjacent the lower end of said arcuate portion so as to extend substantially normal to the end of that portion of the ear engaging element which engages behind the ear, and means for mounting said switch on said cantilevered support portion adjacent the end thereof remote from said arcuate portion, said electrical coupling means including a flexible wire extending from said switch, said cantilevered support portion extending substantially in the plane of said arcuate portion and substantially in a horizontal direction when the individual's head is in an upright position whereby



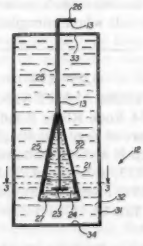
the weight of said switch and pull of said wire acting on the distal end of said cantilevered switch support portion acts on the ear engaging element such that the force transferred to the individual's ear acts substantially along the lower back of the ear generally into the back of the ear in the same direction as the face of the wearer, said means for supporting said switch from the ear of an individual and all appertenances thereto being so disposed as to provide unobstructed access to both the inner and outer cavities of the ear of said individual, said switch being position responsive so as to actuate said alarm when moved into a predetermined angular position relative to the horizontal and being so mounted that the angular position of said switch relative to said cantilevered support portion is adjustable whereby the degree of inclination of the individual's head necessary to actuate said alarm can be adjusted.

3,999,178

ORIENTATION RESPONSIVE ALARM SYSTEM

Stuart R. Hamilton, 3 Bent Hill Drive, Framingham, Mass. 01701

Filed July 14, 1975, Ser. No. 595,625
Int. Cl.² G08B 21/00; B60Q 1/00
U.S. Cl. 340—282 **9 Claims**



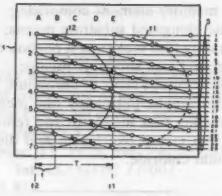
1. An orientation responsive alarm system comprising:
support means;
sensor means mounted on said support means and for providing a sensor output in response to predetermined changes in the orientation of said support means;
timer means for providing an alarm signal in response to a predetermined period of uninterrupted sensor output;
alarm means for generating an alarm in response to said alarm signal; and
auxiliary timer means for preventing the generation of said alarm in response to said predetermined changes in the orientation of said support means that occur at less than a predetermined rate.

3,999,179

DISPLAY PANEL FOR RUNNING CHARACTERS WITH OPTICAL PHASE SHIFT

Eric Sune Prame, Lidingo, Sweden, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 591,917
Claims priority, application Sweden, July 1, 1974, 7408621
Int. Cl.² G09F 9/32
U.S. Cl. 340—334 **5 Claims**



1. A display device having a number of light spots arranged in lines and columns, and a control circuit for providing switch-on switch-off signals to the light spots, whereby a first switch-on respectively switch-off signal is provided at a time *tn* to a first light spot and another switch-on switch-off signal is provided to the next light spot on the same row at time *tn* + T, characterized in that a third switch-on switch-off signal is provided to a third light spot at a time *tn* + T ± Δ T whereby the switching-on switching-off of at least one light spot occurs asynchronously compared to the switching-on switching-off of other light spots.

3,999,180

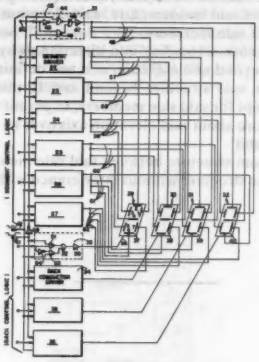
MULTIPLEX DRIVER SYSTEM FOR LIQUID CRYSTAL DISPLAY

Gordon W. Hickman, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 188,686, Oct. 4, 1971, abandoned. This application June 9, 1972, Ser. No. 261,207
Int. Cl.² G02F 1/13; G08B 5/36
U.S. Cl. 340—336 **11 Claims**

1. A multiplex driver system for a liquid crystal display, said system comprising,
a pair of substantially parallel plates,
said plates separated by a liquid crystal material that is responsive to an electric field thereacross for forward scattering light being passed therethrough,
a plurality of conductor segments on one plate of said liquid crystal display, said plurality of condutor segments arranged for forming display characters at each display position,
a plurality of conductors for supplying drive voltages to said conductor segments, individual ones of said conductors connected in a multiplexed arrangement to corresponding conductor segments of each display character at each display position,
a plurality of back conductors on a second plate of said liquid crystal display, said back conductors being substantially aligned with corresponding conductor segments at each display position,
a plurality of individual conductors for supplying drive voltages to each of said back conductors, and

means for providing pulsed and synchronized drive voltages with opposite polarities to said conductor segments and



to said back conductors corresponding to a selected character for providing a display representing the character.

3,999,181

NON-LINEAR DIGITAL-TO-ANALOG CONVERTOR

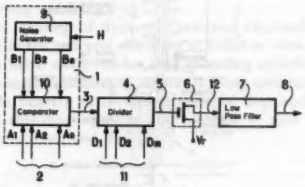
Jean-Jacques Hirsch, Claix, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM), Paris, France

Filed Oct. 24, 1974, Ser. No. 517,836

Claims priority, application France, Oct. 31, 1973, 73.38812

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 DA **7 Claims**



1. Digital-to-analog convertor with quasi-exponential function generation comprising input means for receiving input signal digits in separate groups, one group comprising range digits (E5 to E7) which are the most significant digits of the input signal and which define a range number (N), another group comprising position digits (E1 to E4) which are the less significant digits of the input signal and which define a position number (V), whereby the input signal value is defined by its position in an input range which is defined by the said range number in a succession of input ranges; linear coding means (part of 10) receiving the position digits and supplying a converted position signal representative of a linearly converted position number ($m.2^{-1}+V.2^{-5}$); a noise generator (9) supplying a noise signal having random values through the range of the converted position number, said values being changed in a random way at a frequency much higher than the highest frequency of the changes in the input signal; a comparator (second part of 10) receiving the converted position signal and the noise signal, said comparator supplying a first stochastic signal (3) the value of which is 0 when the converted position number is lower than the noise signal and 1 when this converted number is higher than the noise signal; a controlled probability divider (4) controlled by the range digits, said divider receiving the first stochastic signal and supplying a second stochastic signal having randomly times values which are either 0 or 1, the probability of said second stochastic signal having the value 1 being equal to the probability of the first stochastic signal having the value 1 divided by a dividing ration, this dividing ratio being controlled by the range digits so as to be defined by the range number; and a low pass filter (7) receiving said second stochastic signal and supplying an output analog signal representative of the digital input signal

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3,999,182

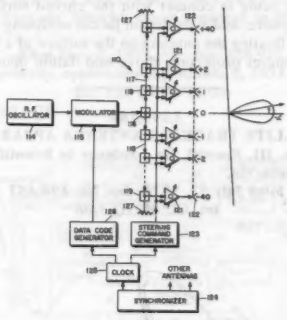
PHASED ARRAY ANTENNA WITH COARSE/FINE ELECTRONIC SCANNING FOR ULTRA-LOW BEAM GRANULARITY

Alvin W. Moeller; Lucas G. Paskalakis, both of Baltimore, Md.; Wilfried G. Jäeckle, deceased, late of Birmingham, Mich.; by Margarete Gesina Jäeckle, and by Volkmar Gerhard Jäeckle, heirs, both of Gottingen, Germany, assignors to The Bendix Corporation, Southfield, Mich.

Filed Feb. 6, 1975, Ser. No. 547,525

Int. Cl.² H01Q *3/26*

U.S. Cl. 343—100 SA **20 Claims**



1. The method of producing smooth scanning motion of a microwave beam radiated by a phased array antenna having a plurality of radiating elements of variable relative phase, comprising the steps of

selecting a phase increment which when multiplied by a factor dependent upon the position of each of said elements relative to a reference element of said array and applied to respective elements of said array will cause the direction of the beam formed by the array to move from a reference direction a fractional part of the total angle through which the beam is to be scanned;

applying said selected phase increment multiplied by said factor to said elements of said array, element by element, in predetermined order, until said multiplied phase increment has been applied to all elements of the array, said elements accumulating the multiplied phase increment thus applied;

again applying said selected multiplied phase increment to said elements of said array, element by element, in said predetermined order, until said multiplied phase increment has again been applied to all elements; and

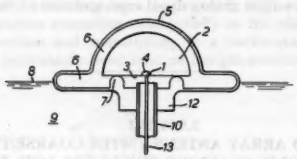
continuing to reapply said selected multiplied phase increment to said elements of said array, element by element, in said predetermined order until the phase increments accumulated by all elements of the array are sufficient to cause the beam formed by the array to be pointed at the maximum scan angle.

3,999,183

FLOATABLE RADIO ANTENNA

John Golden Brett, Northampton, England, assignor to Plessey Handel und Investments A.G., Zug., Switzerland

Filed June 19, 1975, Ser. No. 588,241
Claims priority, application United Kingdom, June 24, 1974, 27985/74
Int. Cl.² H01Q 1/34
U.S. Cl. 343—709 4 Claims



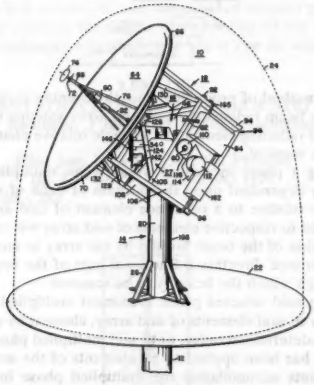
1. A floatable radio antenna, capable of floating on the surface of a liquid with at least part of the antenna projecting above the surface, which includes; a mass of conductive material presenting a solid hemisphere projecting above a datum plane parallel to the surface of the liquid; a mass of dielectric material presenting a hollow hemisphere projecting above said datum plane, the hollow hemisphere and the solid hemisphere being concentric, and the inner curved surface of the hollow hemisphere being in contact with the curved surface of the solid hemisphere; and a floatation jacket enclosing said hemispheres for floating the antenna on the surface of a liquid with said hemispheres projecting above said datum plane.

3,999,184

SATELLITE TRACKING ANTENNA APPARATUS

LeRoy Fuss, III, Roswell, Ga., assignor to Scientific-Atlanta, Inc., Atlanta, Ga.

Filed July 23, 1975, Ser. No. 598,457
Int. Cl.² H01Q 3/08
U.S. Cl. 343—709 14 Claims



1. For use on a ship and the like, and adapted to be mounted at the top of the mast thereof, satellite tracking antenna apparatus which comprises

a pedestal extending upwardly from said mast,

a yoke on said pedestal,

a platform, stabilized for pitch and roll motion of the ship, supported by said yoke,

a turntable mounted on said platform, being rotatable in azimuth about an azimuth axis and defining an elevation axis perpendicular to said azimuth axis,

a box shaped structure mounted on said turntable for rotation in elevation about said elevation axis,

said satellite tracking antenna having a reflector,

a pair of side members and said reflector being three adjacent sides of said box structure, said elevation axis intersecting said side members,

said side members extending in a direction away from said reflector beyond said elevation axis and defining an open area within said structure beyond said turntable, unenclosed except for said side members, to permit rotation of said structure about said elevation axis over an angle of at least 90°, and

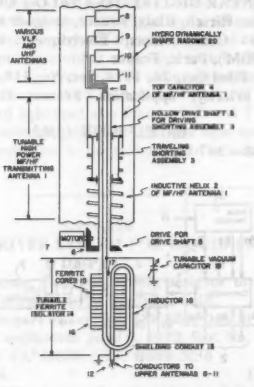
an arched beam structure between said side members bracing said box structure without interference with said open area.

3,999,185

PLURAL ANTENNAS ON COMMON SUPPORT WITH FEED LINE ISOLATION

Michael Stephen Polgar, Jr., Oceanport, and Charles Peter Majkrzak, Nutley, both of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Dec. 23, 1975, Ser. No. 643,882
Int. Cl.² H01Q 1/34, 1/52
U.S. Cl. 343—709 11 Claims


VARIOUS VLF AND UHF ANTENNAS
HYDRO DYNAMICALLY SHAPE RADOME 20
TOP CAPACITOR 4 OF MF/HF ANTENNA 1
HOLLOW DRIVE SHAFT 5 FOR DRIVING SHORTING ASSEMBLY 3
TUNABLE HIGH POWER MF/HF TRANSMITTING ANTENNA 1
TRAVELING SHORTING ASSEMBLY 3
INDUCTIVE HELIX 2 OF MF/HF ANTENNA 1
MOTOR 6
DRIVE FOR DRIVE SHAFT 5
TUNABLE VACUUM CAPACITOR 19
FERRITE CORES 15
TUNABLE FERRITE ISOLATOR 14
INDUCTOR 10
SHIELDING CONDUIT 13
CONDUCTORS TO UPPER ANTENNAS 8-11

1. A single multipurpose antenna structure comprising:

a tunable high power medium frequency/high frequency transmitting antenna having a vertical axis and a shorting assembly driven along said vertical axis to tune said high power antenna;

a hollow drive shaft disposed coaxial of said axis within and coupled to said shorting assembly to drive said shorting assembly;

means coupled to said drive shaft to rotate said drive shaft;

a plurality of additional antennas disposed in a vertical stacked arrangement above said high power antenna;

a plurality of service conductors each coupled to a different one of said plurality of additional antennas;

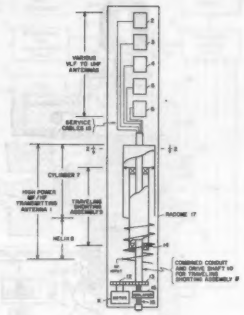
a conduit enclosing said service conductors disposed coaxial of said axis and within said drive shaft; and

a tunable ferrite isolator disposed below said drive shaft including said conduit to enable said conduit and said service conductors to pass through said high power antenna with a minimum of modification to the performance of said high power antenna.

3,999,186
HIGH POWER, HIGH-FREQUENCY, HIGH-VOLTAGE DRIVE COUPLING FOR AN ANTENNA

Charles Peter Majkrzak, Nutley, and Michael Stephen Polgar, Jr., Oceanport, both of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Dec. 24, 1975, Ser. No. 644,286
Int. Cl.² H01Q *1/34, 1/52*
U.S. Cl. 343—709 **29 Claims**



1. A drive arrangement for an antenna having a shorting assembly traveling along a helix to tune said antenna comprising:

a metal drive shaft extending coaxially through said shorting assembly, said drive shaft having flutes in the region of said helix;

a means coupled to said drive shaft for rotation thereof;

a metal shielding cylinder disposed concentric to and spaced from the outer surface of said drive shaft, said shielding cylinder providing an outer member of said shorting assembly;

a drive bearing of dielectric material disposed to engage said flutes and said shielding cylinder so that rotation of said drive shaft rotates said shielding cylinder to cause said shorting assembly to travel along said helix; and

a guide bearing of dielectric material disposed to engage said shielding cylinder and the end of said drive shaft remote from said flutes.

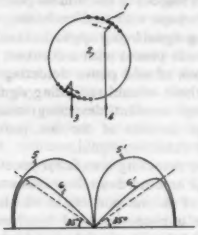
3,999,187
DOPPLER VOR BEACONS

Brian Robert Johnson, Hunters Hill, Australia, assignor to Amalgamated Wireless (Australasia) Limited, Sydney, Australia

Filed Aug. 19, 1974, Ser. No. 498,503
Int. Cl.² G01S *1/40*
U.S. Cl. 343—844 **3 Claims**

1. In a Doppler VOR beacon comprising a central antenna having an omnidirectional radiation pattern in the horizontal plane, a plurality of antennas each having an omni-directional radiation pattern in the horizontal plane disposed around the periphery of a circle centered on the central antenna, means for radiating from the central antenna carrier power modulated with a reference wave, means for radiating from at least one of the circumferentially-disposed antennas at least one sideband of a sub-carrier amplitude modulation of the carrier, and means for commutating the side-band radiation around the ring of antennas to simulate a rotating source, the respective powers radiated from the central and circumferentially-disposed antennas being in a predetermined ratio to each other, the improvement wherein:

the gains of the circumferentially-disposed antennas in the horizontal plane are equal one with another, but the gain of the central antenna in the horizontal plane is greater than that of any one of the circumferentially-disposed antennas, and the radio frequency power applied to the

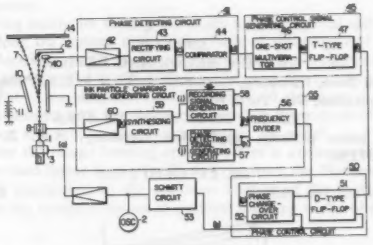


circumferentially-disposed antennas is greater than that which would be required to provide said predetermined power ratio in the case where the gain of the circumferentially-disposed antennas in the horizontal plane is equal to that of the central antenna.

3,999,188
INK-JET RECORDING APPARATUS

Takahiro Yamada, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Dec. 2, 1974, Ser. No. 528,927
Claims priority, application Japan, Dec. 5, 1973, 48-135367
Int. Cl.² G01D *18/00*
U.S. Cl. 346—75 **2 Claims**



1. An ink-jet apparatus comprising:

a nozzle supplied with ink;

a reference oscillator for supplying a reference signal having a predetermined time period T;

ink particle generating means for vibrating the ink in said nozzle in response to said reference signal from said reference oscillator to generate ink particles from said nozzle in synchronism with the period of vibration of the ink;

ink particle charging electrode means for constituting an electrostatic capacitance with said ink particles to charge them;

ink particle deflecting means for producing an electrostatic field in a travel path of the ink particles deflected in a predetermined magnitude of deflection; and

a phase matching device including

i. first circuit means for forming clock pulses in response to said reference signal from said reference oscillator,

ii. second circuit means for reading out a recording signal from a recording signal generating circuit on the basis of said clock pulses to apply said recording signal to said ink particle charging electrode means, said recording signal having a pulse width T, and for reading out a

phase detecting signal from a phase detecting signal generating circuit on the basis of said clock pulses to apply said phase detecting signal to said ink particle charging electrode means, said phase detecting signal having a pulse width in a range from T/2 to T, a polarity opposite to said recording signal and a phase shifted by T with respect to the middle point of pulse peak level in comparison with said recording signal, said phase detecting signal being applied to said ink particle charging electrode means with a constant period at which pulse portions of said phase detecting signal do not overlap with those of said recording signal,

iii. charge amount detecting means for detecting the charge amount of the ink particle charged by said phase detecting signal,

iv. phase detecting means for receiving an output of said charge amount detecting means to judge a first charged state of the ink particle in which the charge amount is above a predetermined level and a second charged state of the ink particle in which the charge amount is below said predetermined level,

v. phase control signal generating circuit means for generating a phase control signal for phase correction in response to an output from said phase detecting means corresponding to said second charged state, and

vi. phase control circuit means for receiving an output of said phase control signal generating circuit means to shift the phases of generation of said recording signal from said recording signal generating circuit and said phase detecting signal from said phase detecting signal generating circuit by T/2, the phase shifting being timed to occur at a predetermined instant selected from the instant of the rise or the instant of the fall of said clock pulses.

3,999,189

GRAPHIC RECORDING DEVICE

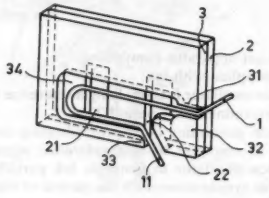
Paul Buro, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 28, 1975, Ser. No. 599,673

Claims priority, application Germany, Aug. 2, 1974, 2437196

Int. Cl.² G01D *15/06*

U.S. Cl. 346—139 C **1 Claim**



1. A device for graphic recording on electrosensitive paper, comprising a recording head comprising a plurality of stacked electrode blocks each having an electrode wire mounted in a recess therein, said wires being bent such that an end of each wire serves as the electrode and is freely movable, wherein said end of the electrode wire projects from the corresponding electrode block obliquely in the direction perpendicular to the stacking direction, each of the electrode blocks comprising at least one opening communicating with said recess, said opening communicating with each other so as to form an interior channel extending through said stacked plurality of blocks adapted for forced air flow to scavenge particles from the recording head.

3,999,190

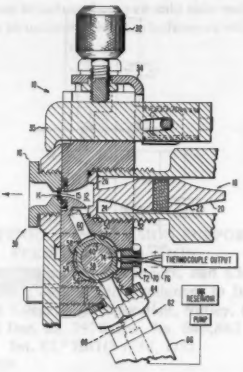
TEMPERATURE CONTROL SYSTEM FOR INK JET PRINTER

Michael K. Brown, Tecumseh; Earl P. Maidment, Royal Oak; David E. Lundquist, Birmingham, and Ronald G. Shell, Dearborn Heights, all of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Oct. 22, 1975, Ser. No. 624,922

Int. Cl.² G01D *15/18*

U.S. Cl. 346—140 R **7 Claims**



1. A control system for an ink jet printer in which the ink is maintained at a preselected temperature prior to droplet generation, said system comprising:

a printing head having at least one cavity therein with a discharge orifice at one end thereof, an inlet into said cavity spaced from said discharged orifice, and a bore adjacent to said cavity;

a heating rod in the bore of said printing head;

a heat exchange member in thermal contact with said heating rod;

means for causing the flow of ink over said heat exchange member to receive an evenly distributed amount of heat generated by the heating rod before the ink enters into the cavity through said inlet;

sensing means in the printing head for sensing the temperature of the ink and for providing an electrical output in response thereto; and

circuit means for energizing the heating rod when the output from the sensing means signals that the ink in the cavity is below a preselected temperature, thereby maintaining the temperature of the ink in the cavity at the preselected temperature just prior to droplet formation.

3,999,191

EXPOSURE TIME CONTROL DEVICE OF ELECTRIC SHUTTER FOR CAMERA

Takeo Saito, and Youichi Seki, both of Chiba, Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Aug. 23, 1974, Ser. No. 499,977

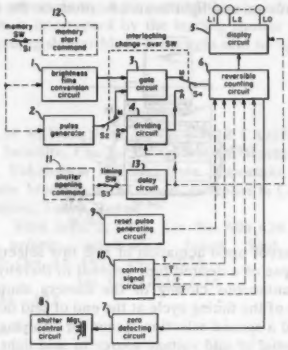
Claims priority, application Japan, Aug. 24, 1973, 48-95008

Int. Cl.² G03B *7/08*

U.S. Cl. 354—23 D **3 Claims**

1. In a camera shutter control circuit of the type including a pulse generator for developing standard pulses at a given rate; a brightness-time conversion circuit for developing a single pulse inversely proportional to the brightness of a subject to be photographed; a gate circuit receptive of the standard pulses and the single pulse for passing the standard pulses only for the duration of the single pulse; a reversible counting

circuit for counting the standard pulses passed by the gate circuit; means for reading out the number of pulses counted by the counting circuit at a lower rate than they were counted and after the camera shutter is open; and means for closing the camera shutter after the content of the counting circuit is zero; the improvement which comprises: said counting circuit comprising a plurality of counting stages including a final stage in cascade and each having outputs representative of the states of the counting stages, the counting stages changing



state as the standard pulses are counted; and wherein the final stage of said counting circuit comprises means for rendering the final stage non-responsive to a preceding counting stage after the final counting stage changes state, whereby the content of the counting circuit will remain non-zero if the number of the standard pulses applied thereto exceeds the capacity of the counting circuit and the means for reading out the number of pulses will initiate read out to permit exposure times greater than that determined by the capacity of the counting circuit.

3,999,192
FOCUS DETECTING SYSTEM

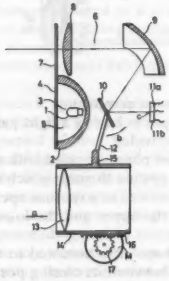
Kazuya Hosoe, Kawasaki, and Seiichi Matsumoto, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 343,211, March, 1973, which is a continuation of Ser. No. 146,957, May, 1971, abandoned. This application Nov. 1, 1974, Ser. No. 520,134

Claims priority, application Japan, May 27, 1970, 45-45812; May 27, 1970, 45-45813; May 27, 1970, 45-45814

Int. Cl.² G03B 3/00

U.S. Cl. 354—25 **12 Claims**



5. An automatic focusing system for an image forming optical system having an optical axis and movable along the optical axis for positioning an image of an object always at a predetermined position, comprising:

ray projecting means for projecting a radiation ray toward the object;

ray receiving means offset from said ray projecting means for receiving the radiation ray reflected by the object at a position offset from the ray projecting means so that the reflected ray impinges on the position from an angle depending upon the distance to the object from the ray projecting means and for forming a ray path depending upon the angle, said ray receiving means including:

ray compressing means for compressing the reflected ray from an illuminated zone into a linear form,

first and second ray sensitive means for providing an electrical output in response to the radiation ray when said ray is received, said ray sensitive means contacting each other at common borders thereof, and being arranged in the ray path with their common borders being almost parallel to the compressed linear form of the reflected ray from the impinged zone,

movable ray deflecting means arranged in the ray path for displacing the position on the first and second ray sensitive means of the compressed linear form of the reflected ray from the illuminated zone into a direction almost perpendicular to said common borders, said deflecting means being connected operatively to the image forming optical system to change the position of the reflected ray from the illuminated zone on the first and second ray sensitive means in correspondence to the change of the position of the optical system on the axis,

said first and second ray sensitive means receiving the compressed form of the reflected ray by means of the ray deflected means;

electrical circuit means for processing the outputs of the first and second ray sensitive means, said circuit means being coupled electrically to both said ray sensitive means for providing as an output an electrical signal in correspondence to the difference in outputs of both sensitive means;

driving means for driving the image forming optical system, along the optical axis on the basis of the output of the electrical circuit means, said driving means being operatively coupled to the optical system and electrically coupled to the electrical circuit means, said electrical circuit means stopping the driving means when the outputs of the first and second ray sensitive means are equal;

whereby the image forming optical system is driven until the compressed linear form of reflected ray from the illuminated zone is positioned on the common borders of the first and second ray sensitive means to perform focusing to the object.

3,999,193
AUTOMATIC CONTROL INDICATION DEVICE IN AN AUTOMATIC CONTROL TYPE ELECTRONIC FLASH UNIT

Hiroshi Hasegawa, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,420

Claims priority, application Japan, July 20, 1974, 49-82751

Int. Cl.² G03B 7/16

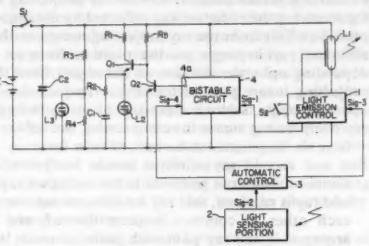
U.S. Cl. 354—33 **5 Claims**

1. An automatic control type electronic flash unit which has a light-sensing element for sensing reflection of light generated by a flashlight discharge tube with the aid of charging current of a capacitor and which automatically discontinues light emission of the interior light discharge tube when the light-sensing element has sensed a predetermined quantity of light, said unit comprising:

means for indicating that light emitted by the flash unit has been automatically controlled;

first signal generating means for generating a first signal when said light-sensing element has sensed a predetermined quantity of light; and

means for receiving said signal as input and for rendering



said indicating means operative upon reception of said signal.

3,999,194

STRUCTURE FOR MOUNTING COMPONENTS FOR SINGLE LENS REFLEX CAMERAS

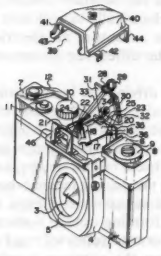
Toshinori Imura, Sakai; Mitsuru Saito, Kaizuka, and Kunio Kawamura, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 10, 1975, Ser. No. 557,221

Claims priority, application Japan, Mar. 14, 1974, 49-28538

Int. Cl.² G03B 7/00, 19/12

U.S. Cl. 354—60 R **8 Claims**



1. Apparatus for a single lens reflex camera, comprising:
a focussing glass plate for focussing reflected light from an object into an image;
a first prism for transmitting at least a portion of said image;
at least one second prism smaller than said first prism mounted thereon and including a light emitting surface;
a prism holder for retaining said first prism;
a plate holder removably supported on said prism holder; a plate disposed on said plate holder; a circuit provided on said plate and including at least part of an exposure controlling electric circuit, and at least one light-receptive element disposed on said plate and having a light receiving surface confronting a predetermined part of said light emitting surface with said plate holder supported on said prism holder.

3,999,195

CAMERA ADJUSTABLE EXPOSURE CONTROL ADAPTER

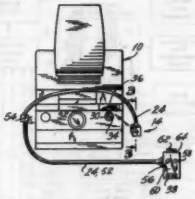
Robert T. Little, 160 Columbia Heights Blvd., Brooklyn, N.Y. 11201

Filed Oct. 14, 1975, Ser. No. 622,163

Int. Cl.² G03B 7/00, 17/48

U.S. Cl. 354—60 L **14 Claims**

1. An exposure adapter for controlling the exposure of a camera having an internal automatic exposure control system which includes a light sensing element for detecting the ambient light conditions, the adapter comprising camera actuation means connectable to the camera for effecting shutter opening to begin an exposure timing cycle; a source of light the intensity of which may be selectively controlled; mounting means for mounting said source of light in juxtaposition to the light sensing element of the camera's internal exposure system; a voltage source of electrical potential; first selection means for applying substantially the full potential of said voltage source to said light source to produce the maximum



intensity thereof upon actuation of said first selection means upon the lapse of a desired time interval to thereby effect an almost instantaneous closing of the camera shutter and a termination of the timing cycle at the end of said desired time interval; and a second selection means for applying a portion of the potential of said voltage source to said light source to produce an intermediate intensity light emission thereof upon actuation of said second selection means to effect a closing of the camera shutter after a predetermined time period corresponding to the intensity of said light source in accordance with the characteristics of the camera's internal exposure system.

3,999,196

PHOTOGRAPHIC CAMERA

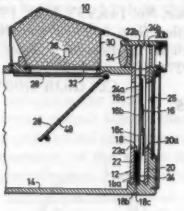
Nobuyoshi Inoue, Kawagoe, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Mar. 27, 1975, Ser. No. 562,424

Claims priority, application Japan, Mar. 30, 1974, 49-36394

Int. Cl.² G03B 19/12, 13/08, 9/38

U.S. Cl. 354—154 **4 Claims**



1. A photographic camera comprising:
a view finder optical system having a light path and
a focal plane shutter provided
at least one shutter base plate provided with an upper portion having a cutout portion through which said light path passes, a lower portion and an exposure aperture which is positioned between the upper and the lower portions of the base plate,
a leading-shutter blade movably mounted to the base plate so that it can move between its closing position where it covers said aperture and its opening position where it opens said aperture, a trailing-shutter blade movably mounted to the base plate so that it can move between its closing position where it covers said aperture and its opening position where it opens said aperture,

said leading-shutter blade being positioned at the upper portion of the base plate when it is moved to its opening position, with a part thereof covering at least a part of the cutout portion;

said trailing shutter blade being positioned at the lower portion of the base plate when it is moved to its opening position and

a shutter drive mechanism mounted on the base plate and coupled to the leading and the trailing shutter blades to operate them,

wherein a part of the light path of the view finder optical system is interrupted by the leading shutter blade when the leading shutter blade is brought into its opening position.

3,999,197

FILM REWINDING DEVICE FOR CAMERAS

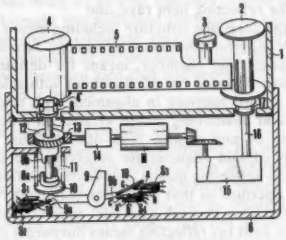
Tomonori Iwashita, Chofu; Shohei Ohtaki, Machida; Susumu Kozuki, Yokohama; Nobuaki Date, Kawasaki, and Soichi Nakamoto, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,438

Claims priority, application Japan, Sept. 3, 1974, 49-101179; Oct. 18, 1974, 49-119938

Int. Cl.² G03B 1/18

U.S. Cl. 354—173 **7 Claims**



1. A film rewinding device for cameras which comprises:

a rewinding member which can be brought into engagement with a film magazine inserted in the camera, said member being movable between a first position in which the member engages with the film magazine and a second position in which it does not engage with the film magazine;

operating means which causes said rewinding member to move from the first position to the second position and vice versa;

driving means for driving said rewinding member to cause the member to perform a rewinding operation;

detecting means for detecting whether the rewinding operation has been completed or is proceeding, the variance of the load on said rewinding member being detected by the detecting means; and

means for controlling said driving means, said means including:

a. a first electric circuit which starts up said driving means and supplies electric power to the driving means for a preset period of time;

b. a second electric circuit which operates the driving means by beginning to supply an electric power to the driving means in response to a detection output of said detecting means representing that the rewinding operation is proceeding and by stopping the power supply in response to a detection output of the detecting means representing the completion of rewinding; and

c. a first switching means for actuating the first and second electric circuits, the switching means being arranged to be turned on in response to the movement of the rewinding member to the first position caused by said operating means.

3,999,198

DEVICE FOR CHECKING THE ROTATION OF A TAKE-UP SPOOL IN A CAMERA

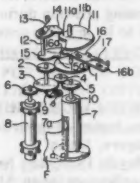
Hidenobu Kondo, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 28, 1975, Ser. No. 626,374

Claims priority, application Japan, Nov. 6, 1974, 49-133639[U]; Nov. 6, 1974, 49-133640[U]

Int. Cl.² G03B 1/00

U.S. Cl. 354—212 **7 Claims**



1. In a camera having a film take-up spool rotatable by an advance gear train operatively associated with a film advance lever having a preparatory angle, a device for checking the rotation of the take-up spool comprising:

a. a first interlocking member operatively associated with said film take-up spool and displaceable so as to assume a first position when said advance lever is in its retracted position and to assume a second position when said advance lever is pulled out beyond said preparatory angle;

b. a second interlocking member operatively associated with the cover of the camera and displaceable so as to assume a first position when said cover is open and to assume a second position when said cover is closed; and

c. a checking means operable to assume a restraining position for restraining said advance gear train and to assume a releasing position for releasing the restraint, said checking means being operatively associated with said first and second interlocking members to assume said restraining position only when both of said first and second interlocking members assume their first positions and otherwise to assume said releasing position.

3,999,199

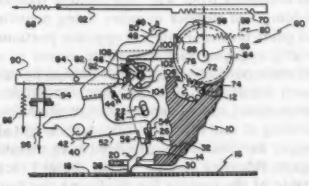
FILM METERING MECHANISM

David Easton Beach, Penfiled, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,700

Int. Cl.² G03B 1/00

U.S. Cl. 354—213 **3 Claims**



1. In a camera adapted to receive and use film of the type having metering perforations at predetermined intervals, said camera including a transport mechanism for advancing film along the camera exposure plane, a metering mechanism having an active condition disabling said transport means and an inactive condition, and means operative for placing said metering mechanism in its inactive condition; an improvement comprising:

a sensing pawl movable from a sensing position on one side of the exposure plane to an extended position transvers-

ing said exposure plane and further movable, in response to movement of a film within the camera, from said extended position to a metering position;

means operatively associated with the metering mechanism while in its inactive condition for applying a biasing force to said pawl to urge said sensing pawl toward said extended position and for disengaging said sensing pawl from said biasing force upon movement of said sensing pawl to said metering position; and

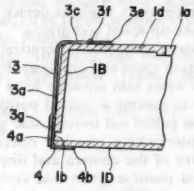
means, including a spring acting substantially parallel to the exposure plane of said camera, for returning said sensing pawl to said sensing position during return of said metering mechanism to its inactive condition.

3,999,200

FILM PACK WITH LIGHT SHIELDING MEANS

Toshio Goto, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 8, 1975, Ser. No. 575,860
Claims priority, application Japan, May 11, 1974, 49-52468
Int. Cl.² G03B 17/26
U.S. Cl. 354—277 5 Claims



1. A film pack for use in association with a camera employing film in the form of individual film units which comprises:

a container of rectangular box-like configuration having a front wall formed with at least one slit-like opening forming a discharge outlet for discharging exposed film unit therethrough, side walls, a rear wall, a bottom wall and an exposure opening defined by a frame member, said side walls being provided thereon first guide means in position adjacent to edges where said front wall meets said side walls,

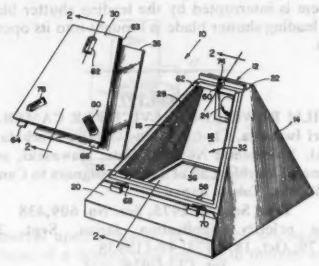
light shielding means provided on said container, said light shielding means including a light shielding and stopper member of resilient material which extends across the width of said front wall of said container for completely shielding said discharge outlet, said light shielding and stopper member including a main portion in contact with said container front wall and slidable thereon, said light shielding and stopper member being provided with second guide means as integral opposite portions thereof for slidably engaging said first guide means so as to permit said main portion to be slidably guided by said first guide means between a lower position for shielding said discharge outlet and an upper raised position for terminating shielding of said discharge outlet, said light shielding and stopper member being provided with means adapted to engage releasing means to be thereby actuated from outside of the camera for displacing the former so as to terminate the shielding of said discharge outlet after said film pack has been loaded within the camera, said light shielding means further including a unitary light shielding plate member of resilient material of L-shaped cross section having one portion fixed to the bottom wall of said container and the other portion extending upwardly and resiliently pressed towards the front wall and partially overlapping the main portion of said light shileding and stopper member when said light shielding and stopper member is in its lower position to form a two layer resiliently displaceable light shield for said discharge outlet.

3,999,201

MIRROR MOUNT FOR PHOTOGRAPHIC OPTICAL SYSTEM

Peter F. Costa, Winthrop; Frederick M. Finnemore, North Reading; Donald H. Hendry, Rockland, and Bruce K. Johnson, Andover, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1975, Ser. No. 574,026
Int. Cl.² G03B 17/17
U.S. Cl. 354—288 19 Claims



1. Photographic exposure chamber apparatus comprising:

means for reflecting light rays; and

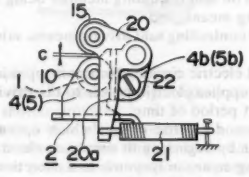
an opaque cone-like structure including means for defining an inlet aperture through which image-carrying light rays may enter said chamber, means for defining an outlet aperture disposed out of alignment with said inlet aperture, a third aperture in alignment with said inlet aperture, and positioning means located on a portion of the surface of said opaque cone-like structure facing outwardly of said chamber for receiving and locating said light ray reflecting means in overlying relationship to said third aperture so that image carrying light rays entering said chamber through said inlet aperture are redirected by said light ray reflecting means outwardly of said chamber through said outlet aperture, said light ray reflecting means and said structure in combination defining said exposure chamber.

3,999,202

AUTO-PROCESS CAMERA FILM PROCESSING APPARATUS

Toshio Goto, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Apr. 3, 1975, Ser. No. 564,975
Claims priority, application Japan, Apr. 4, 1974, 49-38673
Int. Cl.² G03D 9/02
U.S. Cl. 354—304 1 Claim



1. In an auto-process camera which employs film in the form of individual immediately processable film units, each of said film units including at least a negative image layer exposable to produce a negative image of an object and a positive image layer on which a positive viewable image corresponding to the image produced on the negative image layer may be

formed under the action of processing solution diffused through the film unit, and at least one breakable pod containing processing solution at a leading edge portion thereof, and which comprises means for forwarding successive exposed film units from an exposure station to a film processing means and an exit permitting extraction of successive exposed and processed film units from said camera, the improvement wherein said film processing means comprises:

a fixed base element having width larger than the width of said film unit,

first support elements which are in fixed attachment to said base element,

first processing roll means rotatbly mounted on and supported by said first support elements,

second support elements pivotally mounted on said first support elements,

second processing roll means rotatably mounted on and supported by said second support elements with its axis generally parallel to said first roll means,

spring means urging said second support elements to pivot in a first direction to bring said second roll means towards said first roll means,

stop means contactable by said second support elements to prevent said second support elements from moving more than a predetermined amount in said first direction to provide a predetermined minimum clearance between said first roll means and said second roll means and said stop means being so located that said second roll means may be brought into sufficient proximity to said first roll means to ensure complete spreading by said first and second roll means of processing solution through a film unit passed between said first and second roll means,

roll means drive means,

drive transmission means connecting said drive means to at least one of said roll means, and

wherein said stop means is constituted by eccentrically rotatable cam members provided on said first support elements and being fixable at different rotary positions, whereby said second roll means may be brought to different degrees of proximity to said first roll means in accordance with the type of film units employed in said camera.

3,999,203

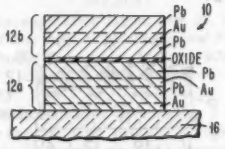
JOSEPHSON JUNCTION DEVICE HAVING INTERMETALLIC IN ELECTRODES

Syamal K. Lahiri, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 456,099, March 29, 1974, and a continuation-in-part of Ser. No. 279,593, Aug. 10, 1972, which is a continuation of Ser. No. 103,088, Dec. 31, 1970, abandoned. This application Nov. 20, 1975, Ser. No. 633,760

Int. Cl.² H01L *27/12*

U.S. Cl. 357—5 **54 Claims**



1. A tunnel device exhibiting Josephson tunneling current, comprising:

a first electrode comprised of at least one superconducting material and at least one non-superconducting material forming an intermetallic compound with said at least one superconducting material,

a tunnel barrier in contact with said first electrode comprised of an insulating layer having atoms of said at least one superconducting material therein and being sufficiently thin that Josephson current can tunnel therethrough, and

a second electrode in contact with said tunnel barrier, said second electrode being comprised of a superconducting material.

3,999,204

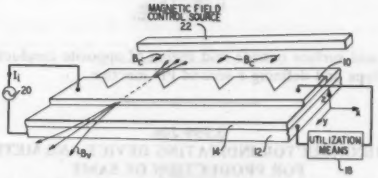
SUPERCURRENT DEVICES HAVING ELECTRODE CONFIGURATIONS FOR MOVING VORTICES UNDER MAGNETIC FIELD CONTROL

Theodore Alan Fulton, Warren Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 3, 1975, Ser. No. 637,176

Int. Cl.² H01L *39/22*

U.S. Cl. 357—5 **17 Claims**



1. A superconductive device comprising

a supercurrent structure which includes a pair of superconductive layers and a weak-link layer separating said superconductive layers and contiguous therewith,

said structure being adapted to support the propagation of mobile flux vortices therein and having a length, as measured in the direction of said propagation, which is much greater than the Josephson penetration depth λ_J, characterized in that

at least one of said superconductive layers includes a plurality of segments of one width joined to one another by segments of narrower width which form potential wells in which vortices tend to rest, said segments being shaped to provide directionality to vortex propagation.

3,999,205

RECTIFIER STRUCTURE FOR A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Roger Green Stewart, Neshanic Station, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 3, 1975, Ser. No. 564,910

Int. Cl.² H01L *29/90, 27/02, 27/10, 27/15*

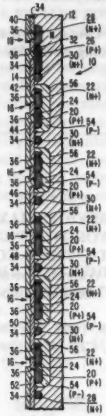
U.S. Cl. 357—13 **7 Claims**

1. In a semiconductor device of the type which has a body of semiconductive material having a surface and at least one zone of one type and degree of conductivity adjacent to said surface, means defining a rectifier in said zone comprising a region of conductivity type opposite to that of said zone in said zone adjacent to said surface,

a first pair of side-by-side regions of mutually opposite type conductivity in said region of opposite conductivity type and adjacent to said surface, said pair of regions forming a first PN junction,

separate contacts to each of said side-by-side regions, and

a second pair of side-by-side regions in said zone adjacent to



said surface outside said region of opposite conductivity type and defining a second PN junction.

3,999,206

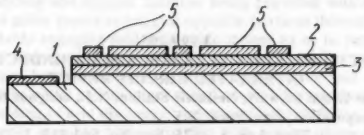
SEMICONDUCTOR INDICATING DEVICE AND METHOD FOR PRODUCTION OF SAME

Vladimir Alexandrovich Babenko, ulitsa Sadovo-Karetnaya, 8, kv. 60; Galina Georgievna Boeva, Zavodskoi proezd, 20, kv. 102, both of Moscow; Eduard Efimovich Violin, prospext Nauki, 16, korpus 1, kv. 89; Jury Alexandrovich Vodakov, prospekt Engelsa, 69/1, kv. 35, both of Leningrad; Eleonora Grigorievna Ivanova, Erevanskaya ulitsa, 13, korpus 1, kv. 12; Tatyana Georgievna Kmita, Odesskaya ulitsa, 17, kv. 63, both of Moscow; Vadim Ivanovich Pavlichenko, ulitsa Polevaya, 20/1, Kaliningrad Moskovskoi oblasti; Igor Veniaminovich Ryzhikov, 9 Parkovaya ulitsa, 49, korpus 1, kv. 67, Moscow; Georgy Fedorovich Kholuyanov, ulitsa Manchesterskaya, 18, kv. 73, Leningrad; Igor Ivanovich Kruglov, 15 Parkovaya ulitsa, 46, korpus 1, kv. 35, Moscow; Galina Alexandrovna Lomakina, prospekt Engelsa, 69/1, kv. 109, Leningrad, and Vladimir Pavlovich Novikov, 13 Parkovaya ulitsa, 40, korpus 2, kv. 24, Moscow, all of U.S.S.R.

Continuation of Ser. No. 520,870, Nov. 4, 1974, abandoned, which is a continuation of Ser. No. 330,586, Oct. 5, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 645,098

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **5 Claims**



1. A semiconductor display device comprising a semiconductor crystal having a base n-region with a concentration of atoms of from 1.5×10^{18} to 5×10^{18} cm^{-3}, a surface diffused p-region 0.1 to 0.3 μm thick, continuous and uniform over the entire area, a compensated region 0.5 to 1.2 μm thick containing a luminescence activator, a single contact to the n-region, a plurality of ohmic contacts to the p-region, the shape and size of each one of said plurality of ohmic contacts determining the shape and size of the luminous surface portions when the ratio of the resistance between the ohmic contacts in the p-region to the resistance of the material adjoining each ohmic contact is not less than 10.

3,999,207

FIELD EFFECT TRANSISTOR WITH A CARRIER INJECTING REGION

Michio Arai, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

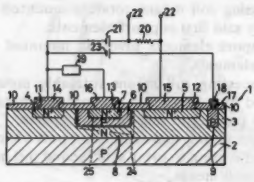
Filed June 19, 1974, Ser. No. 480,749

Claims priority, application Japan, Jan. 21, 1973, 48-70120; June 21, 1973, 48-70121

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² H01L *29/80*

U.S. Cl. 357—22 **3 Claims**



1. A planar semiconductor device comprising a semiconductor substrate of a first conductivity type, an epitaxial layer of opposite conductivity type overlying said substrate, a source region of opposite conductivity type and of an impurity concentration greater than said epitaxial layer formed in the surface of said epitaxial layer, a drain region of opposite conductivity type and of an impurity concentration greater than said epitaxial layer formed in the surface of said epitaxial layer and laterally offset from said source region, a first gate region of first conductivity type formed in said epitaxial layer between said source and drain regions, a second gate region of opposite conductivity type and of an impurity concentration greater than said epitaxial layer formed in said first gate region, a gate control circuit connected between said source region and said second gate region, a first potential source, a load resistor connected to said first potential source and the combination connected between said source and drain regions, output terminals connected to opposite ends of said load resistor, an emitter region of a first conductivity type formed in said epitaxial layer, and a second potential source connected to said emitter region.

3,999,208

CHARGE TRANSFER SEMICONDUCTOR DEVICE

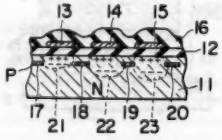
Shinji Shimizu, Choufu, Japan, assignor to Hitachi, Ltd., Japan

Continuation of Ser. No. 404,894, Oct. 10, 1973, abandoned. This application July 14, 1975, Ser. No. 595,437

Claims priority, application Japan, Oct. 18, 1972, 47-103577

Int. Cl.² H01L *29/78*

U.S. Cl. 357—24 **11 Claims**



1. A charge transfer semiconductor device comprising:
a semiconductor substrate of a first conductivity type;
a first layer of insulating material disposed on the surface of said substrate;
a plurality of gate electrode layers disposed on the surface of said first layer of insulating material; and

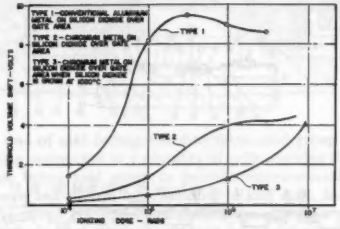
a plurality of charge transfer passages buried within said substrate, so as to be isolated from each other and completely spaced from the surface thereof by the substrate, between respective portions thereof beneath said gate electrodes for effecting the transfer of charge carriers between the portions of said substrate beneath said electrodes in response to the application of control voltages to said gate electrodes.

3,999,209

PROCESS FOR RADIATION HARDENING OF MOS DEVICES AND DEVICE PRODUCED THEREBY

Charles Y. Wrigley, Fullerton, and Raymond A. Kjar, Newport Beach, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 14, 1970, Ser. No. 71,701
Int. Cl.² H01L *29/78*
U.S. Cl. 357—23 **11 Claims**



1. In a process for making a semiconductor device which is hardened to radiation for external means, the steps of:

growing an insulating layer at least on the gate region of said device at temperatures ranging between 1000° and 1040° centigrade; and

depositing a metallic layer on at least the insulating layer which is over the gate region of said device.

3,999,210

FET HAVING A LINEAR IMPEDANCE CHARACTERISTIC OVER A WIDE RANGE OF FREQUENCY

Takaaki Yamada, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

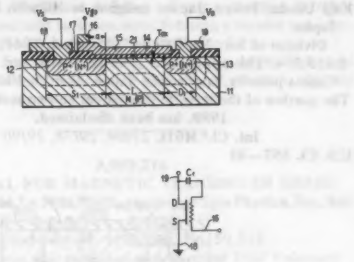
Continuation of Ser. No. 391,464, Aug. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,168, May 7, 1973, abandoned. This application Sept. 9, 1974, Ser. No. 504,503

Claims priority, application Japan, Aug. 28, 1972, 47-85950

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² H01L *29/78*
U.S. Cl. 357—23 **5 Claims**

1. A field effect transistor comprising: a semiconductor substrate of one impurity type, two spaced regions of opposite conductivity type in respect to said substrate in one face thereof providing laterally separated source and drain regions and defining a channel region therebetween having ends adjacent said two spaced regions, a first insulating layer overlying said one face, a second one-piece resistive polycrystalline layer having a resistivity in the range from 10,000 ohms/square to 30 giga-ohms/square overlying said first insulating layer over said channel region and above a portion of said source and drain regions, and a single gate electrode in ohmic contact with the portion of said second resistive polycrystalline layer which overlies said source and drain regions, and said gate electrode mounted so that none of it overlies said



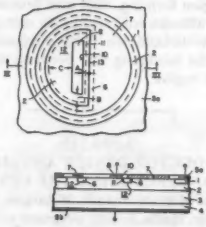
channel region and its edge nearest said channel is spaced a distance laterally from said channel.

3,999,211

THYRISTOR

Peter Voss, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 8, 1975, Ser. No. 575,665
Claims priority, application Germany, May 10, 1974, 2422748
Int. Cl.² H01L *29/74*
U.S. Cl. 357—38 **5 Claims**

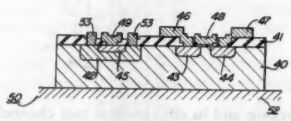


1. A semiconductor switching device comprising a body of semiconductor material, said body comprising a substantially flat top surface, an emitter zone of a first type of semiconductivity, a base zone of a second type of semiconductivity adjacent to said emitter zone, said zones sharing a portion of said flat top surface, a PN junction at the interface between said zones, said PN junction interface having a portion forming a straight line along said flat top surface, said straight line lying parallel to a crystallographic direction of [110], said device further comprising an emitter electrode and a control electrode each disposed on said flat top surface, said emitter electrode contacting said emitter zone, said emitter electrode having a straight edge spaced from and parallel to said straight line, said control electrode contacting said base zone, said control electrode having a straight edge spaced from and parallel to said straight line, whereby the shortest separation distance between said control electrode and said emitter zone is the separation distance between said straight edge of said control electrode and said straight line.

3,999,212
FIELD EFFECT SEMICONDUCTOR DEVICE HAVING A PROTECTIVE DIODE

Koji Usuda, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 710,047, March 4, 1968, Pat. No. 3,555,374. This application June 26, 1970, Ser. No. 50,081
Claims priority, application Japan, Mar. 3, 1967, 42-13079
The portion of the term of this patent subsequent to Jan. 12, 1988, has been disclaimed.
Int. Cl.² H01L *27/04, 29/78, 29/90*
U.S. Cl. 357—41 **23 Claims**



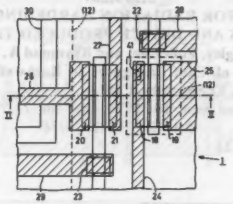
1. A semiconductor device comprising:
a semiconductor substrate having a pair of opposing first and second surfaces and including
a first, relatively low resistivity region of a first conductivity type exposed on both of said first and second surfaces;
a second, relatively high resistivity region of the first conductivity type exposed on said first surface, and
a diode region of a second conductivity type opposite to said first conductivity type contacting said first region and extending to said first surface;
an insulating film formed on said first surface of the substrate, and having a relatively thick portion and a relatively thin portion, said relatively thin portion of the insulating film covering at least a surface portion of said second region and being susceptible to electro-static breakdown;
a first electrode formed on said relatively thin portion of the insulating film and electrically connected to said diode region; and
a second electrode connected to said first region at said second surface of the substrate;
said diode region forming, with said first region, a PN junction having a backward breakdown voltage lower than the electro-static breakdown voltage of said relatively thin portion of the insulating film between said electrode and said second region.

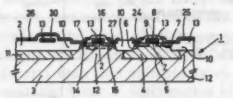
3,999,213
SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE DEVICE

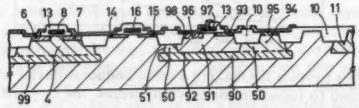
Bernardus Maria Michael Brandt, Nijmegen, Netherlands, and Joseph Shappir, Haifa, Israel, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 349,739, April 10, 1973, abandoned. This application Oct. 29, 1974, Ser. No. 518,227
Claims priority, application Netherlands, Apr. 14, 1972, 7205000
Int. Cl.² H01L *27/02*
U.S. Cl. 357—42 **14 Claims**

1. A semiconductor device having a semiconductor body comprising plural semiconductor circuit elements including at least one insulated gate field effect transistor, said semiconductor body comprising a substrate portion of a first type conductivity and on the substrate portion an epitaxial layer of a second type conductivity opposite to that of the first and having a top surface, a pattern of electrically insulating material inset in the top surface of the epitaxial layer and surrounding and defining plural separated upstanding portions of the epitaxial layer, the top surfaces of said plural upstanding portions each extending to the top surface of the epitaxial layer within the insulating pattern, the epitaxial layer being thicker than the inset pattern and extending below the inset pattern, at least one of said upstanding portions and the underlying adjacent epitaxial layer portions containing a concentration of first type conductivity activators greater than that of unconverted epitaxial layer portions and sufficient to convert same to first type conductivity material to form at least one annular first zone of first type conductivity adjoining the top surface and which extends throughout the epitaxial layer thickness to connect to the substrate portion, another of said upstanding portions being of the second type conductivity to form a second region within the said annular first zone and adjoining the top surface, spaced source and drain zones of said field effect transistor and of the first type conductivity in







the said second region and adjoining the top surface and also adjoining the inset pattern, at least one gate electrode layer of said field effect transistor and extending over the space between the source and drain zones and being separated from the semiconductor body by an insulating layer, said second region being island-shaped and also being entirely surrounded below the insulating pattern by a part of the activator-converted first type first zone of the epitaxial layer whereby said island shaped second region forms with the surrounding activator-converted zone and with the underlying substrate portion a p-n junction which also adjoins the inset pattern, and a further circuit element incorporated in said converted first zone of the epitaxial layer.

3,999,214
WIREABLE PLANAR INTEGRATED CIRCUIT CHIP STRUCTURE

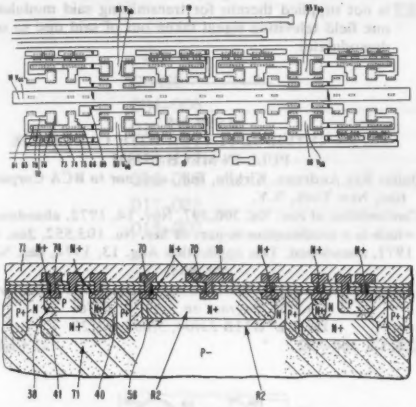
Eugene E. Cass, Hopewell Junction, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 483,463, June 26, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,824
Int. Cl.² H01L *27/10, 27/02, 27/04, 23/48*
U.S. Cl. 357—45 **25 Claims**

1. In a planar semiconductor integrated circuit chip structure comprising a surface from which a plurality of regions of different conductivity types extended into the chip to provide transistors and resistors,
the improvement wherein said transistors and resistors are arranged into a plurality of repetitive cells, each of said cells containing a sufficient number of transistors and resistors to form a selected type of logic circuit and said cells being arranged in an orthogonal array with the cells in substantially parallel rows in both orthogonal direc-

tions, and wherein the structure includes a level of metallization disposed above and insulated from said array by at least one layer of electrically insulative material, said level of metallization comprising

a plurality of groups of substantially parallel lines respectively disposed above and running parallel to a corresponding plurality of interfaces between rows of said cells



in one of said orthogonal directions, said group of lines being connected to a plurality of cells abutting the interface below said group to provide interconnections between and voltage level supplies to said cells, and

line patterns respectively disposed spaced from and between said groups and above said cells to provide intracell connections.

3,999,215

INTEGRATED SEMICONDUCTOR DEVICE COMPRISING MULTI-LAYER CIRCUIT ELEMENT AND SHORT-CIRCUIT MEANS

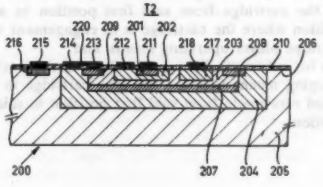
Einar Andreas Aagaard, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 354,516, April 26, 1973, abandoned. This application Mar. 21, 1975, Ser. No. 560,643

Claims priority, application Netherlands, May 31, 1972, 7207325

Int. Cl.² H01L *27/04, 27/02, 29/34*

U.S. Cl. 357—48 **9 Claims**



1. An integrated semiconductor device comprising:

a. a semiconductor body;

b. at least a multi-layer semiconductor circuit element located in said body and adjoining a surface thereof;

c. a tub-shaped isolation zone entirely surrounding the circuit element in the semiconductor body and isolating said circuit element from the remainder of said semiconductor body, said circuit element comprising a first zone of a certain conductivity type adjoining the inner wall of said isolation zone, said isolation zone having a conductivity type opposite to that of said first zone and to that of the part of the semiconductor body surrounding said isolation zone, said isolation zone and said first zone of said circuit element defining a first p,n junction therebetween and said isolation zone forming a second p,n junction with said semiconductor body; and

d. means for short-circuiting said first p,n junction, said means being connected to said circuit element via only said first zone and to said isolation zone.

3,999,216

MATERIAL FOR MAGNETIC TRANSDUCER HEADS

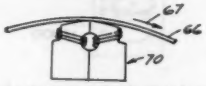
Jean Berchtold, La Jolla, Calif., assignor to Spin Physics, Inc., San Diego, Calif.

Filed July 30, 1970, Ser. No. 59,512

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² G11B *5/22, 5/14*

U.S. Cl. 360—125 **6 Claims**



1. A hot-pressed sintered magnetic material consisting essentially of an alloy having an aluminum content of 4 to 6.5% by weight and a silicon content from 8 to 11% by weight, with the remainder substantially iron, said sintered magnetic material being characterized by a porosity of substantially less than 1%, a Vickers hardness greater than 600 (measured at a 300 gram load) and a resistivity of at least 100 micro-Ohm-centimeters.

3,999,217

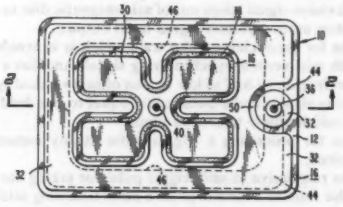
SEMICONDUCTOR DEVICE HAVING PARALLEL PATH FOR CURRENT FLOW

Willem Gerard Einthoven, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,151

Int. Cl.² H01L *23/48, 29/06*

U.S. Cl. 357—68 **5 Claims**



1. A semiconductor device comprising:

a body of semiconductor material and a first region within said body,

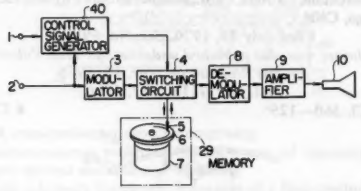
a terminal lead and an elongated electrode for conducting current between said first region and said lead, and

an elongated second region within said body providing a parallel path for current between said lead and said first region, said elongated second region being of higher conductivity than and being of a conductivity type opposite to that of said first region, said elongated electrode providing an ohmic contact between said first region and said elongated second region, said elongated electrode and said elongated second region being elongated in substantially the same direction.

3,999,218
VIDEO SIGNAL RECORDING AND REPRODUCING APPARATUS FOR STOP MOTION PICTURE

Akiyoshi Iyama, Sagamihara; Toshi Ito, Tokyo; Katsutoshi Tajima, and Hiroshi Ishibashi, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 4, 1973, Ser. No. 347,661
Claims priority, application Japan, Apr. 7, 1972, 47-34380
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.[2] H04N *5/78*
U.S. Cl. 360—35 **8 Claims**



1. A recording and reproducing apparatus for recording and reproducing one field television signal selected from multiple television signals comprising:

a television signal source for generating said multiple television signals having vertical synchronizing signals;

a modulator whose input terminal is supplied with said multiple television signals generated from said television signal source for producing modulated multiple television signals suitable for recording;

a single magnetic disc which is rotated at a rate of one revolution per one field period for storing a modulated one field television signal selected from said modulated multiple television signals;

a single fixed head for recording said modulated one field television signal on said magnetic disc together with erasing an unnecessary signal previously recorded on said magnetic disc by said modulated one field television signal supplied to said head and for taking out said modulated one field television signal stored on said magnetic disc repeatedly upon completion of the recording of said modulated one field television signal;

a demodulator for demodulating said modulated one field television signal taken out of said magnetic disc to deliver a stop motion picture signal as its output;

means for producing a pulse train which is in synchronism with said vertical synchronizing signals and has a repetition frequency half as low as that of said vertical synchronizing signals and a pulse width equal to one field period of said multiple television signal;

means for producing a trigger pulse at any instant when desired;

means responsive to said trigger pulse for taking out of said pulse train as a control pulse a pulse following said trigger pulse;

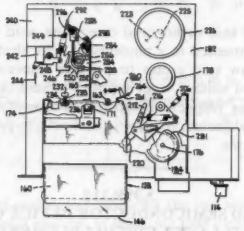
first switching means connected between said modulator and said head, said first switching means being conductive state during a period when said control pulse is supplied thereto for transmitting said modulated one field television signal from said modulator to said head;

second switching means connected between said head and said demodulator, said second switching means being conductive state during a period when said control pulse is not supplied thereto for transmitting said modulated one field television signal taken out of said disc to said demodulator.

3,999,219
TAPE CARTRIDGE PLAYER WITH CARTRIDGE PULL-IN MECHANISM

Dallas Roy Andrews, Kirklin, Ind., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 306,397, Nov. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 103,552, Jan. 4, 1971, abandoned. This application Aug. 13, 1974, Ser. No. 496,964
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976
Int. Cl.[2] G11B *23/04, 5/008, 15/29*
U.S. Cl. 360—92 **22 Claims**



1. A tape cartridge player comprising:

a plurality of receptacles each adapted to receive a tape cartridge of the type including a detent notch;

cartridge player tape operating means spaced apart from each of the tape cartridges when said cartridges are inserted into said receptacles in a first position;

means associated with each of said receptacles for engaging each respective tape cartridge notch when the cartridge is initially inserted in said first position in said receptacle to hold the tape cartridge in said first position and for moving the cartridge from said first position to a second position where the cartridge is in engagement with said cartridge player operating means; and

means for automatically sequentially actuating each of said engaging means to move the tape cartridge in its associated receptacle from said first position to said second position.

DESIGN PATENTS

GRANTED DECEMBER 21, 1976

ERRATA

For CLASS	See PATENT NO.
004–006	242,748
019–062	242,787
011–133	242,812
015–030	242,816
011–088	242,817
015–007	242,825

DESIGNS

DECEMBER 21, 1976

NOTE A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

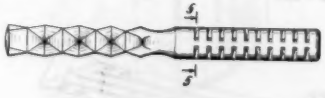
242,746
BOOT
Guy de Massacre, 124, Avenue des Champs-Elysees, Paris (Seine), France
Filed June 6, 1975, Ser. No. 584,493
Claims priority, application France, Dec. 13, 1974, 74.30696
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

242,747
BASEBALL GLOVE
James Robert McTear, 32 Squadron Line, Simsbury, Conn. 06070
Filed May 27, 1975, Ser. No. 580,850
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

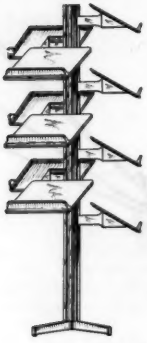
242,748
COMBINED SNOW BRUSH AND ICE SCRAPER
Joseph A. Graham, 239 Niagara St.; Reginald M. Stephenson, 874 Crescent Drive, and Donald D. Dewar, 95 Edelweiss Crescent, all of Winnipeg, Manitoba, Canada
Filed Sept. 9, 1975, Ser. No. 611,663
Claims priority, application Canada, July 16, 1975, 1607755
Term of patent 14 years
Int. Cl. D4—*01*; D7—*05*
U.S. Cl. D4—06

242,749
HAND OPERATED THREAD LOOPING MACHINE
Billy H. Matthews, 2659 Heritage, Las Vegas, Nev. 89121
Filed Nov. 1, 1974, Ser. No. 519,943
Term of patent 14 years
Int. Cl. D15—*06*; D2—*07*
U.S. Cl. D3—19 A

242,750
VENTED HAIR BRUSH BLOCK OR SIMILAR ARTICLE
Douglas Misercola, Mamaroneck, N.Y., assignor to Empire Brushes, Inc.
Filed Dec. 11, 1975, Ser. No. 639,846
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31



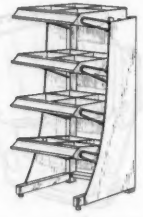
242,751
NEWSPAPER DISPLAY STAND
Stanley Wells, Bridgewater, Conn., assignor to Mar-Line Displays Inc., Port Chester, N.Y.
Filed Jan. 12, 1976, Ser. No. 648,001
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24



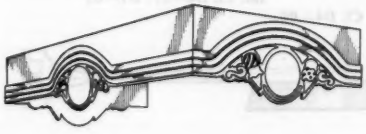
242,752
SHELF OR SIMILAR ARTICLE
Robert D. Palmer, 6470 E. Paseo St., Long Beach, Calif. 90802
Filed Apr. 28, 1975, Ser. No. 572,214
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—132

242,753
STAND FOR POTTED PLANTS
Louis J. Christen, Jr., St. Louis, Mo., assignor to Christen Incorporated, St. Louis, Mo.
Filed Oct. 31, 1975, Ser. No. 627,510
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—183

242,754
DISPLAY STAND
Fred Howard, New York, and Sydney Edson, East Meadow, both of N.Y., assignors to Hanes Corporation, Winston-Salem, N.C.
Filed Apr. 14, 1976, Ser. No. 676,749
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—188



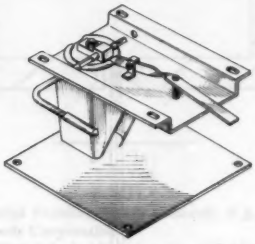
242,755
ROOFLESS CANOPY FOR USE ABOVE A RETAIL SALES COUNTER, OR SIMILAR ARTICLE
Leon H. Richman, Long Beach, and James Michael Clayton, Costa Mesa, both of Calif., assignors to Baskin-Robbins Ice Cream Co.
Filed Mar. 28, 1974, Ser. No. 455,557
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



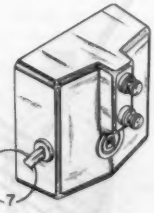
242,756
SHOULDER CONTOUR GARMENT HANGER
Charles F. Boren, 16230 Orchard Ave., Gardena, Calif. 90247
Filed Dec. 10, 1975, Ser. No. 639,370
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—256

242,757
FOLDABLE PAINTER'S EASEL
Archie H. Stark, 7850 Slater Ave., Space No. 54, Huntington Beach, Calif. 92647
Filed June 30, 1975, Ser. No. 591,283
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—176

242,758
SEAT PEDESTAL
Robert E. Strang, North Liberty, Ind., assignor to The Injection Plastic Co., Inc., Plymouth, Ind.
Filed July 23, 1975, Ser. No. 598,205
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—194



242,759
ROTISSERIE MOTOR HOUSING
David L. Painter, Glenview, Ill., and Edward J. Duquaine, Jr., West Bend, Wis., assignors to Dart Industries Inc., Los Angeles, Calif.
Filed May 19, 1975, Ser. No. 578,696
Term of patent 14 years
Int. Cl. D7—*05*; D15—*5*
U.S. Cl. D7—129

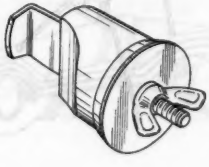


242,760
COMBINED FORK AND CHOPSTICK
Wayne E. Jensen, Homewood, Ill., assignor to B & J Rocket (Hong Kong) Limited, Kowloon, Hong Kong
Filed Nov. 8, 1974, Ser. No. 521,976
Claims priority, application United Kingdom, May 17, 1974, 966677/74
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—149

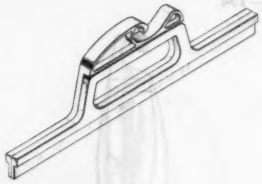
242,761
SNOW SHOVEL
Vincent S. DiCarlo, 611 W. 57th St., Kansas City, Mo. 64113
Filed May 16, 1975, Ser. No. 578,131
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—10

242,762
STAPLER
Maynard Frank Wolfe, Hong Kong, assignor to Prodev Limited, Hong Kong
Filed June 11, 1975, Ser. No. 585,917
Claims priority, application United Kingdom, Jan. 8, 1975, 969314/75
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D8—50

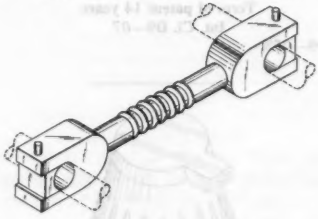
242,763
DOOR FASTENER
Robert S. Carlton, 10006 Cedar, Overland Park, Kans. 66207
Filed Sept. 22, 1975, Ser. No. 615,713
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—109



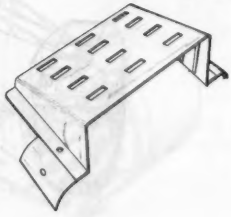
242,764
COMBINED HOOK AND HANDLE FOR A CARRIER BAG
Seymour Kamins, Oceanside, N.Y., assignor to CTP Industries, Inc., Brooklyn, N.Y.
Filed July 25, 1975, Ser. No. 599,250
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—154



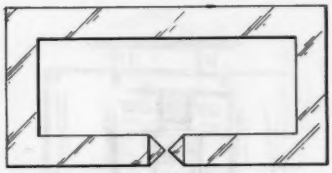
242,765
SPACER FOR TOWER TRANSMISSION LINES
Frank D. Patrick, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed Jan. 28, 1976, Ser. No. 653,057
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—230



242,766
BRACKET FOR MOUNTING A RADIO OR THE LIKE IN A VEHICLE
Roy M. Neece, 3248 Cheryl Lane, Haltom City, Tex. 76117
Filed Feb. 20, 1976, Ser. No. 659,644
Term of patent 14 years
Int. Cl. D8—*08*; D12—*16*
U.S. Cl. D8—233



242,767
LINK FOR A DECORATIVE CHAIN
Koichi Yamaguchi, 252 E. 51st., New York, N.Y. 10022
Filed Apr. 16, 1974, Ser. No. 461,438
Term of patent 14 years
Int. Cl. D11—*01*; D8—*99*
U.S. Cl. D8—261

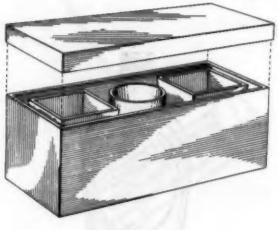


242,768
BOTTLE
Lucien O'Dendal Frohling, North Caldwell, N.J., assignor to General Foods Corporation
Filed July 3, 1975, Ser. No. 592,835
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—67

242,769
BOTTLE
Lucien O. Frohling, North Caldwell, N.J., assignor to General Foods Corporation
Filed Aug. 6, 1975, Ser. No. 602,350
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—67

242,770
BOTTLE
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 605,976
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

242,771
COMBINED COMPARTMENTED CONTAINER AND COVER FOR FOOD OR THE LIKE
Gilles Papillon, 288 1st Ave. West, Portneuf, Quebec, Canada
Filed May 17, 1974, Ser. No. 471,027
Claims priority, application Canada, Apr. 11, 1974, 45995
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—185



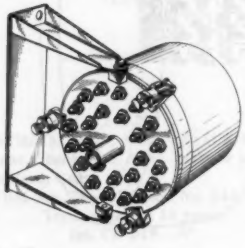
242,772
BOTTLE
Michael David Marlow, 17, Pine Ridge Road, Burfield Common, Reading, Berkshire, England
Filed June 13, 1975, Ser. No. 586,681
Claims priority, application United Kingdom, Dec. 16, 1974, 969071/74
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—194

242,773
FOAM DISPENSING CAP
Anthony Licari, Cooper City; Jerry H. Miller, Miami Lakes, and Richard E. Kresge, Miami, all of Fla., assignors to Thiokol Corporation, Newtown, Pa.
Filed July 5, 1974, Ser. No. 486,130
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—258

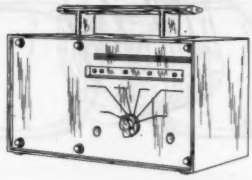
242,774
WRIST WATCH
Freddy Huguenin, Lausanne, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland
Filed Apr. 3, 1975, Ser. No. 564,711
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38

242,775
COMBINED PENCIL AND DISTANCE ESTIMATING DEVICE FOR GOLFERS
Albert J. Williams, Jr., 901 Llanfair Road, Ambler, Pa. 19002
Filed Apr. 19, 1976, Ser. No. 677,906
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—70

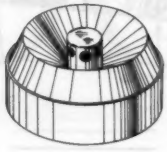
242,776
PRESSURE MONITORING UNIT FOR TELEPHONE CABLES OR THE LIKE
William J. Jakobsen, Farmingdale, N.Y., assignor to Lourdes Industries, Inc., Hauppauge, N.Y.
Filed Feb. 14, 1975, Ser. No. 549,877
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—75



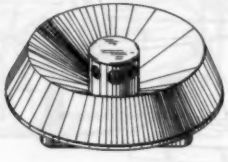
242,777
CABINET FOR AN ELECTRONIC IGNITION ANALYZER
William M. McCaughin, Cocoa Beach, Fla., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Apr. 18, 1975, Ser. No. 569,523
Term of patent 7 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



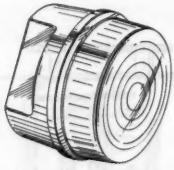
242,778
ULTRASONIC INTRUSION ALARM
Ralph W. Goble, Eldora, and Kenneth R. Hackett, Boulder, both of Colo., assignors to Sonitrix, Inc., Boulder, Colo.
Filed July 10, 1975, Ser. No. 594,660
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106



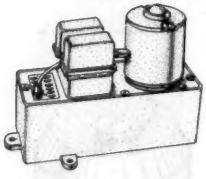
242,779
ULTRASONIC INTRUSION ALARM
Ralph W. Goble, Eldora, and Kenneth R. Hackett, Boulder, both of Colo., assignors to Sontrix, Inc., Boulder, Colo.
Filed July 10, 1975, Ser. No. 594,661
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106



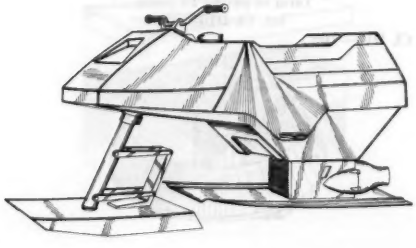
242,780
SAFETY FLASHER
Dale T. Kelley, 2329 N. 39th Place, Phoenix, Ariz. 85008
Filed May 6, 1975, Ser. No. 574,867
Term of patent 14 years
Int. Cl. D10—*06*; D26—*02*
U.S. Cl. D10—114



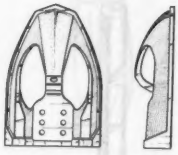
242,781
SCHOOL BUS FLASHER CIRCUITRY MODULE
Joseph E. Baader, 333 Holiday Drive, Springfield, Ohio 44505
Filed May 20, 1975, Ser. No. 579,161
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—121



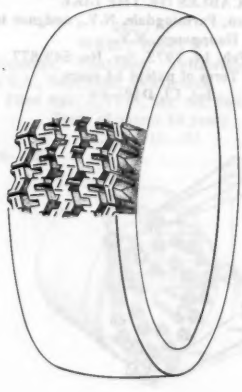
242,782
WATER SPORTS VEHICLE
Nelson Tyler, Van Nuys, Calif., assignor to Still Water Properties, N.V., Curacao, Netherlands Antilles
Filed Sept. 4, 1975, Ser. No. 610,281
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—69



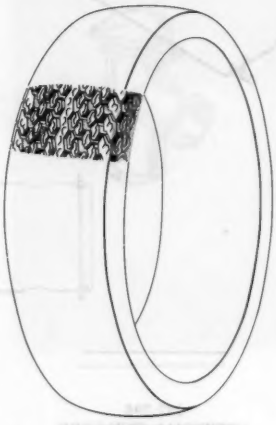
242,783
TRICYCLE BODY
Andrew K. Jacobson, 28125 Ranchwood, and Stuart Glasier, 20630 Winchester, both of Southfield, Mich. 48076
Filed July 17, 1975, Ser. No. 596,864
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—112



242,784
PNEUMATIC TIRE TREAD AND BUTTRESS
James F. Newman, St. Clair Shores, Mich., assignor to Uniroyal, Inc., New York, N.Y.
Filed Sept. 30, 1974, Ser. No. 510,184
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



242,785
PNEUMATIC TIRE TREAD AND BUTTRESS
Arthur C. Blankenship, Howell, Mich., assignor to Uniroyal, Inc.
Filed Nov. 11, 1974, Ser. No. 522,568
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



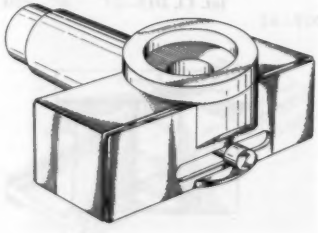
242,786
HOOD ORNAMENT
Robert McAvin, 429 Jade Cove Way, Seal Beach, Calif. 90740
Filed Sept. 22, 1975, Ser. No. 616,159
Term of patent 7 years
Int. Cl. D12—*16*
U.S. Cl. D12—199

242,787
EDUCATIONAL AIDE FOR MEASURING MASS
Michael J. Kane, Chelmsford, Mass., assignor to Xerox Corporation, Stamford, Conn.
Filed Jan. 28, 1975, Ser. No. 544,737
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—62

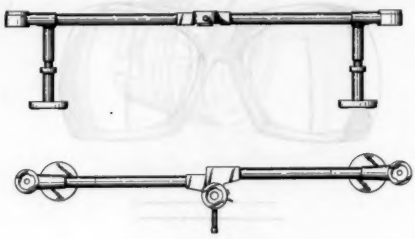
242,788
PAIR OF SPECTACLES
Richard M. Beane, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Aug. 7, 1975, Ser. No. 602,851
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

242,789
PAIR OF SPECTACLES
Richard William Canavan, III, South Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 625,984
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

242,790
MICROSCOPE VERTICAL FLUORESCENT ILLUMINATOR
John T. Armbruster, Niagara Falls, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 19, 1976, Ser. No. 659,448
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—83

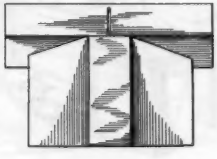


242,791
MULTI-VIEWING MICROSCOPE ATTACHMENT
John T. Armbruster, Niagara Falls, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Mar. 3, 1976, Ser. No. 663,374
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—83



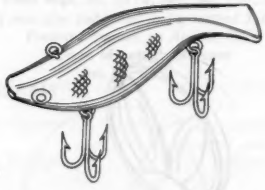
242,792
PEN
Barry Noel Loftus, 1/9 Ruthven St., Macleod, Victoria 3085, Australia
Filed July 15, 1974, Ser. No. 488,762
Claims priority, application Australia, Jan. 15, 1974, 64320/74
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—49

242,793
EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT
Michael J. Kane, Chelmsford, Mass., assignor to Xerox Corporation, Stamford, Conn.
Filed Jan. 28, 1975, Ser. No. 544,738
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—62



242,794
CHART BOARD
George R. Kane, P.O. Box 5421, San Mateo, Calif. 94402
Filed May 16, 1975, Ser. No. 578,277
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—89

242,795
ARTIFICIAL FISH LURE
Jack E. Davis, Georgetown, Fla., assignor to Victor Comptometer Corporation, Chicago, Ill.
Filed Mar. 26, 1976, Ser. No. 670,736
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



242,796
GUN SIGHT
Cecil J. Ross, El Paso, Tex., assignor to W. R. Weaver Company, El Paso, Tex.
Filed Aug. 21, 1975, Ser. No. 606,631
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D22—8

242,797

MILK LINE CHECK VALVE

Kendall R. Johnson, Albert Lea, Minn., assignor to Universal Cooperatives, Inc., Albert Lea, Minn.

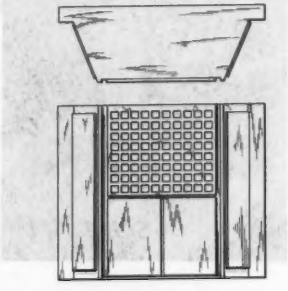
Filed Dec. 8, 1975, Ser. No. 638,601
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—22

242,798

TRUCK BODY MOUNTED REFRIGERATION UNIT

William A. Forsty, Murrysville, Pa., and Donald K. Mayer, Bloomington, Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed Oct. 22, 1974, Ser. No. 517,273
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—142

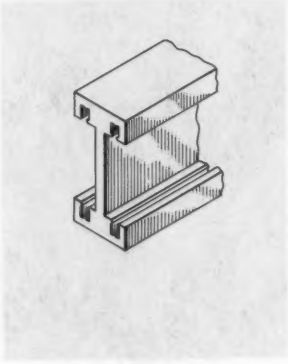


242,799

PLASTIC THERMAL BARRIER FRAMES AND THE LIKE

Dietrich F. Schmidt, Carlisle, Pa., assignor to Capitol Products Corporation, Mechanicsburg, Pa.

Filed May 27, 1975, Ser. No. 580,966
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75

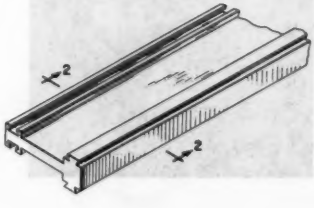


242,800

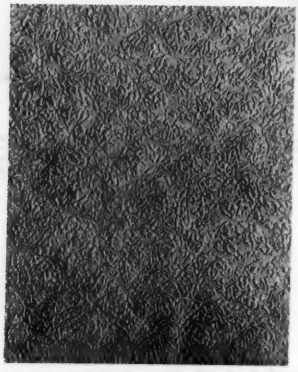
PLASTIC THERMAL BARRIER FOR USE IN CONSTRUCTING THERMALLY INSULATED WINDOWS DOORS, AND/OR FRAMES AND THE LIKE

Dietrich F. Schmidt, Carlisle, Pa., assignor to Capitol Products Corporation, Mechanicsburg, Pa.

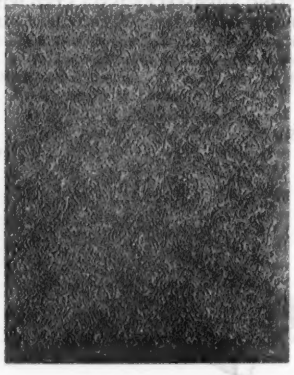
Filed Jan. 27, 1975, Ser. No. 544,197
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—76



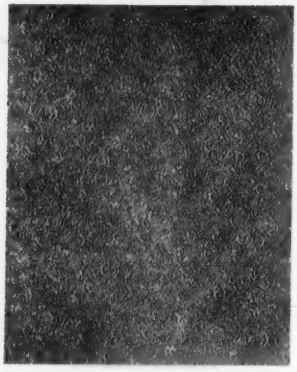
242,801
CEILING TILE
Phillip Schuss, Columbus, Ohio, assignor to Certain-teed Corporation, Valley Forge, Pa.
Filed July 29, 1975, Ser. No. 600,163
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80



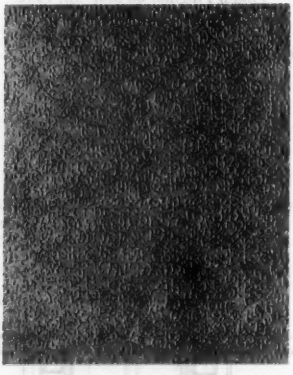
242,802
CEILING TILE
Phillip Schuss, Columbus, Ohio, assignor to Certain-teed Corporation, Valley Forge, Pa.
Filed July 29, 1975, Ser. No. 600,164
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80



242,803
CEILING TILE
Phillip Schuss, Columbus, Ohio, assignor to Certain-teed Corporation, Valley Forge, Pa.
Filed July 29, 1975, Ser. No. 600,165
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80



242,804
CEILING TILE
Phillip Schuss, Columbus, Ohio, assignor to Certain-teed Corporation, Valley Forge, Pa.
Filed July 29, 1975, Ser. No. 600,166
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80

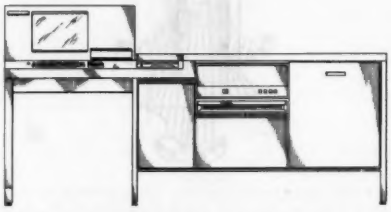


242,805

CONSOLE ENCLOSURE FOR ELECTRONIC EQUIPMENT

Wayne Carl Cathey, Bedford, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 20, 1975, Ser. No. 633,724
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

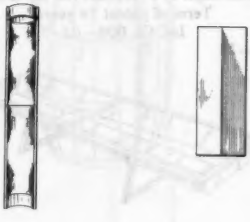


242,806

CORNER LOUDSPEAKER ENCLOSURE

Paul A. Stone, 4626 Cavendish Road, Indianapolis, Ind. 46220

Filed Jan. 31, 1975, Ser. No. 546,018
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

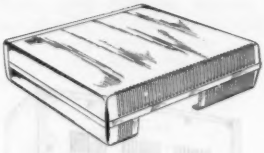


242,807

DICTATION MACHINE OR THE LIKE

Ronald E. Hunt, Austin; William M. Jenkins, Leander, both of Tex., and Eliot F. Noyes, New Canaan, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 14, 1975, Ser. No. 558,517
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B

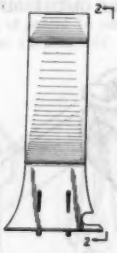


242,808

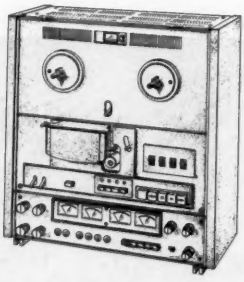
TELEPHONE ACCESSORY

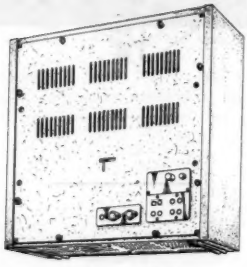
Robert S. Moberg, Monrovia, Calif., assignor to Graphic Marking Systems, Inc., Monrovia, Calif.

Filed Apr. 7, 1975, Ser. No. 565,519
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

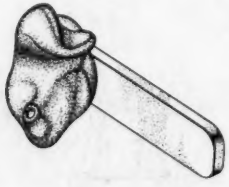


242,809
TAPE RECORDER
Yoshinori Fukuda, Yokohama, and Kiichi Takahashi, Tokyo, both of Japan, assignors to Denki Onkyo Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. D. 403,485, Oct. 4, 1973, abandoned. This application July 2, 1975, Ser. No. 592,639
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 B





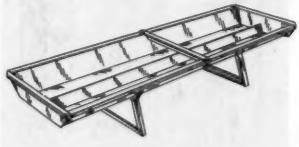
242,810
COMBINED MOLDED EARPIECE AND SUPPORT FOR LIGHTWEIGHT HEADSETS
Frederick L. Rynearson, Yorba Linda, Calif., assignor to Rynearson, Incorporated, Fullerton, Calif.
Filed Aug. 29, 1974, Ser. No. 501,598
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 H



242,811
LIGHTER
Franz Alban Stuetzer, Muehlheim (Main), and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke, GmbH, Offenbach (Main), Germany
Filed Mar. 3, 1976, Ser. No. 663,334
Claims priority, application Germany, Sept. 30, 1975, 9897
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

242,812
MIRROR PLAQUE
Michael Plesset, Pittsburgh, Pa., assignor to Concept Galleries, Inc., Pittsburgh, Pa.
Filed Apr. 21, 1975, Ser. No. 570,253
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—133

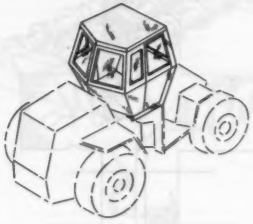
242,813
LIVESTOCK FEED BUNK
Wesley Max Walker, Loveland, Colo., assignor to Walker Manufacturing Company, Fort Collins, Colo.
Filed Sept. 2, 1975, Ser. No. 609,351
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—13



242,814
RAG DOLL
Rose Brissenden, 14 Harrison Ave., Woburn, Mass. 01801
Filed Dec. 28, 1971, Ser. No. 213,231
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

242,815
TOY JACK-IN-THE-BOX
Takashi Kaga, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc.
Filed Feb. 28, 1975, Ser. No. 554,094
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15 R

242,816
CAB FOR CONSTRUCTION TRACTOR
Herman Joseph Maurer, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.
Filed Mar. 22, 1976, Ser. No. 669,156
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—30



242,817
EAR CLIP
Nazareno J. Saccoccio, Cranston, R.I., assignor to Aro-Sac Inc.
Filed Oct. 20, 1975, Ser. No. 624,173
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—88

242,818
CROSS
Dwight F. Wood, 317 Redondo Drive, Oceanside, Calif. 92054
Filed July 21, 1975, Ser. No. 597,467
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D31—21.3

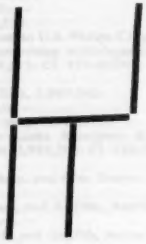
242,819
COMBINED POLE LAMP AND VENTILATOR
Wally G. Kerr, 1407 Kansas St., Norman, Okla. 73069
Filed Apr. 28, 1975, Ser. No. 572,018
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 D

242,820
TABLE LAMP
Frank J. Parrella, 1310 Westgate Terrace, Chicago, Ill.
Filed Feb. 2, 1976, Ser. No. 654,227
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R

242,821
ELECTROLUMINESCENT CHARACTER X
Michael A. Cannon, Oakland, Calif., assignor to Micon Industries
Filed Sept. 3, 1974, Ser. No. 503,032
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

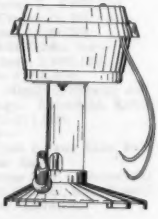
242,822
ELECTROLUMINESCENT CHARACTER R
Michael A. Cannon, Oakland, Calif., assignor to Micon Industries
Filed Sept. 3, 1974, Ser. No. 503,033
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

242,823
ELECTROLUMINESCENT CHARACTER K
Michael A. Cannon, Oakland, Calif., assignor to Micon Industries, a California Corporation
Filed Sept. 3, 1974, Ser. No. 503,036
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

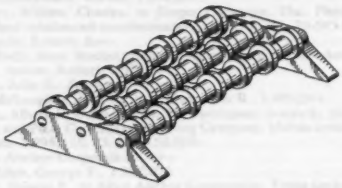


242,824
ELECTROLUMINESCENT CHARACTER B
Michael A. Cannon, Oakland, Calif., assignor to Micon Industries, a California Corporation
Filed Sept. 3, 1974, Ser. No. 503,042
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

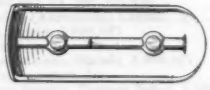
242,825
EVAPORATIVE COOLER PUMP
June M. Morris, Arlington, Tex., assignor to American Excelsior Company, Arlington, Tex.
Filed Mar. 26, 1975, Ser. No. 562,151
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7



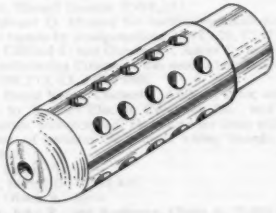
242,826
FOOT MASSAGER OR SIMILAR ARTICLE
Rosa L. Posh, 713 Logan Ave., Bronx, N.Y. 10465, and Fernando L. Jimenez, 112 Colonial Spring Road, Colonial Springs, N.Y. 11798
Filed May 1, 1975, Ser. No. 573,544
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 S



242,827
FEMORAL PROSTHESIS
Robert B. Elliott, 10902 Wickwild, Houston, Tex. 77024
Filed Mar. 31, 1976, Ser. No. 672,178
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D83—1 E



242,828
MEDICAL SUCTION INSTRUMENT TIP
Charles A. Lahay, Fayette, Ala., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Feb. 6, 1975, Ser. No. 547,516
The portion of the term of this patent subsequent to Oct. 19, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—12 A



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TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF DECEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & P Products Incorporated: *See—*
Gabor, Robert J., 3,999,126.

A. Schild S.A.: *See—*
Irion, Ulrich, 3,998,671.

A. W. Faber-Castell: *See—*
Katz, Otto, 3,998,558.

Aagaard, Einar Andreas, to U.S. Philips Corporation. Integrated semiconductor device comprising multi-layer circuit element and short-circuit means. 3,999,215, Cl. 357-48.000.

AB Bofors: *See—*
Skagerlund, Lars-Erik, 3,999,060.

Abbott Laboratories: *See—*
Horrom, Bruce Wayne, 3,998,971.

Abboud, Harry L, to Kaiser Aluminum & Chemical Corporation. Liquid heater device. 3,998,208, Cl. 126-377.000.

Abe, Osamu: *See—*
Morimoto, Shinichiro; and Abe, Osamu, 3,998,739.

Abelitis, Andris: *See—*
Hinterkeuser, Jakob; and Abelitis, Andris, 3,998,583.

Abex Corporation: *See—*
Gilbert, Richard H.; and Griffith, Arvon M., 3,998,573.

Abington Incorporated: *See—*
Smith, Sumner, Jr.; Typrowicz, Wladyslaw; and Leonhardt, Horst M., 3,997,936.

Ablad, Bengt Arne Hjalmar: *See—*
Brandstrom, Arne Elof; Carlsson, Per Arvid Emil; Carlsson, Stig Ake Ingemar; Corrodi, Hans Rudolf; Ek, Lars; and Ablad, Bengt Arne Hjalmar, 3,998,790.

Acda, Petrus Marinus, to Polva-Nederland B.V. Mandril for shaping a bell end on a pipe of thermo-plastic material. 3,998,578, Cl. 425-393.000.

ACF Industries, Incorporated: *See—*
Berzlapa, Juris, 3,998,194.

Acushnet Company: *See—*
Porter, Raymond P.; Manchester, Kenneth L.; and Shih, Peter T. K., 3,997,935.

Adachi, Takashi: *See—*
Yomoto, Chobe; Adachi, Takashi; Nakajima, Yutaka; Hidaka, Hidemasa; Yoshida, Tsukasa; and Sugawara, Fumio, 3,998,696.

Adachi, Yoshiharu, to Aisin Seiki Kabushiki Kaisha. Hydraulic power booster system. 3,998,128, Cl. 91-29.000.

Adams, Ben E.; Sardisco, John B.; and Drechsel, Erhart K., to Pennzoil Company. Manufacture of potassium sulfate. 3,998,935, Cl. 423-552.000.

Adams, Frederick John, to Cam Gears Limited. Rotary valve for power steering with hydraulic reaction. 3,998,131, Cl. 91-372.000.

Adelman, Robert Leonard, to Du Pont de Nemours, E. I., and Company. Ceramic compositions and articles made therefrom. 3,998,917, Cl. 264-63.000.

Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, to G. D. Searle & Co. Anti-diarrheal compounds. 3,998,832, Cl. 260-293.540.

Admiral Homes, Inc.: *See—*
Barnett, Norton C., 3,998,013.

Aeronutronic Ford Corporation: *See—*
Smith, Carl H.; Walters, Louis G.; and Durand, Eric, 3,998,406.

Aeschlimann, Peter: *See—*
Koller, Stefan; and Aeschlimann, Peter, 3,998,805.

AGFA-Gevaert, A.G.: *See—*
Schranz, Karl-Wilhelm; and Kunitz, Friedrich-Wilhelm, 3,998,641.
Wick, Richard; and Orthmann, Jurgen, 3,998,543.

AGFA-GEVAERT N.V.: *See—*
Van den Houte, Jozef Willy; Gilliams, Yvan Karel; and De Roo, Pierre Richard, 3,998,636.

Aggust Thyssen-Hutte AG: *See—*
Bellen, Franz-Josef; Nikoleizig, Alfons; and Meuters, Friedrich, 3,998,181.

Aign, Volker; Walz, Klaus; Hornle, Reinhold; Wolf, Karlheinz; and Pusch, Norbert, to Bayer Aktiengesellschaft. Aqueous pigment dispersions. 3,998,652, Cl. 106-308.00N.

Air Preheater Company, Inc., The: *See—*
Finnemore, Harlan E., 3,998,266.

Air Products and Chemicals, Inc.: *See—*
Jones, John Paul, 3,999,088.

Aisin Seiki Kabushiki Kaisha: *See—*
Adachi, Yoshiharu, 3,998,128.
Kondo, Toshio, 3,998,466.

Akashi, Koichiro; Higuchi, Hikaru; and Yamanaka, Takatomo, to Mitsubishi Jukogyo Kabushiki Kaisha. Flow-measuring device. 3,998,097, Cl. 73-211.000.

Aker, Irvin G.: *See—*
Williamson, Clyde E.; and Aker, Irvin G., 3,998,173.

Aktiebolaget Hassle: *See—*
Brandstrom, Arne Elof; Carlsson, Per Arvid Emil; Carlsson, Stig Ake Ingemar; Corrodi, Hans Rudolf; Ek, Lars; and Ablad, Bengt Arne Hjalmar, 3,998,790.

Akzo N.V.: *See—*
Hutton, Ronald Eric; Iles, Brian Rodney; and Oakes, Vincent, 3,998,782.

Akzona Incorporated: *See—*
de Jongh, Hendrik Paul, 3,998,813.

Alagna, Anthony M. Reciprocator. 3,998,388, Cl. 239-187.000.

Albaret S.A.: *See—*
Paramythioti, Michel, 3,998,287.

Albert, William Charles, to Singer Company, The. Fluid pressure pulsed rebalanced accelerometer. 3,998,104, Cl. 73-503.000.

Albrecht, Robert: *See—*
Rody, Jean; Rochat, Alain Claude; Peterli, Hans Jakob; and Albrecht, Robert, 3,998,804.

Allan, John R.: *See—*
McLaughlin, Neil B.; and Allan, John R., 3,999,061.

Allen, Albert J.; Davis, Arthur D.; Fasimpaur, James J.; Goglia, Fred A.; and Pike, Cecil A., to Koehring Company. Mobile concrete batch plant. 3,998,436, Cl. 259-154.000.

Allen Anchor Corporation: *See—*
Allen, George E., 3,998,026.

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Allen, James D., to Phillips Petroleum Company. P-Styryldiethylphosphine. 3,998,887, Cl. 260-606.50P.

Allen, Ralph E.: *See—*
Gibson, Christian D.; Allen, Ralph E.; and Peters, Donald G., 3,998,346.

Allied Chemical Corporation: *See—*
Gilman, John J.; and Ropp, Richard C., 3,999,145.
Rogic, Milorad M.; and Fuhrmann, Robert, 3,998,882.
Taub, Bernard, 3,998,775.

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Stenkvist, Sven-Einar, 3,999,000.
Torok, Vilmos, 3,998,305.

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Eisenhardt, Fred W., 3,998,275.

Alonso, Ocsar: *See—*
Anhalt, John W.; Goodman, David S.; and Alonso, Ocsar, 3,998,512.

Altherr, Russell George, to Amsted Industries Incorporated. Coupler double shelf collar. 3,998,337, Cl. 213-153.000.

Aluminum Company of America: *See—*
Hudson, Lawrence Keith; and Swansiger, Thomas G., 3,998,927.

Alvarez, Francisco S.; and Van Horn, Albert R., to Syntex (U.S.A.) Inc. Novel prostaglandin intermediates and process for the production thereof. 3,998,852, Cl. 260-345.800.

Amalgamated Wireless (Australasia) Limited: *See—*
Johnson, Brian Robert, 3,999,187.

Amano, Hiroshi: *See—*
Shikata, Eiji; and Amano, Hiroshi, 3,998,691.

American Cyanamid Company: *See—*
Asato, Goro; and Bentley, Terence James, 3,998,959.
Conrow, Ransom Brown; and Bernstein, Seymour, 3,998,957.
Giglia, Robert Domenico, 3,998,525.
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American Gas Association, Inc.: *See—*
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American Home Products Corporation: *See—*
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American Paper Products Company: *See—*
Seipel, Hans J., 3,998,137.

Amey, David Anthony: *See—*
Gittos, Maurice Ward; and Amey, David Anthony, 3,998,965.

Amini, Bijan: *See—*
Ernst, Richard Edward; Amini, Bijan; and Bareford, William John, 3,998,936.

Amsted Industries Incorporated: *See—*
Altherr, Russell George, 3,998,337.

Anders, Edward O. Method for recovering small particles of heavy precious metals by amalgamation. 3,998,629, Cl. 75-109.000.

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Anderson, Edwin A.: *See—*
Webb, Derrel D., 3,998,443.

Anderson, Glenn A.: *See—*
Kreick, John R.; and Anderson, Glenn A., 3,998,618.

Anderson, John W., to H. H. Robertson Company. Double-skin insulated building panel. 3,998,023, Cl. 52-595.000.

Anderson, Teddy Lee: *See—*
Findley, Gerald Ivan; Cummings, Kenneth Dean; and Anderson, Teddy Lee, 3,999,168.

Anderson, Thomas P., to Microseal Corporation. Film record card. 3,997,992, Cl. 40-159.000.

Anderson, Winton C.: *See—*
Lane, Marvin K.; and Anderson, Winton C., 3,998,769.

Andre, Claude Maurice, to Sofited 2. Machine for manufacturing corrugated structures. 3,998,140, Cl. 93-84.00R.

Andrews, Dallas Roy, to RCA Corporation. Tape cartridge player with cartridge pull-in mechanism. 3,999,219, Cl. 360-92.000.

Anhalt, John W.; Goodman, David S.; and Alonso, Ocsar, to International Telephone and Telegraph Corporation. Electrical connector. 3,998,512, Cl. 339-17.0CF.

Antes, Alan C.; Drehle, James R.; and Harrison, Blair H., to Hewlett-Packard Company. Fabrication of thick film resistors. 3,998,980, Cl. 427-103.000.

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Anthony, Thomas R.; Cline, Harvey E.; and Chang, Mike F., to General Electric Company. Method for cleaning semiconductor devices. 3,998,653, Cl. 134-1.000.

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Anthony, Thomas R.: *See—*
Chang, Mike F.; Anthony, Thomas R.; and Cline, Harvey E., 3,998,661.

Antoshkiw, Thomas William; Cannalonga, Marco Alfred; and Koff, Arnold, to Hoffmann-La Roche Inc. Water dispersible carotenoid preparations and processes thereof. 3,998,753, Cl. 252-312.000.

Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, to Sankyo Company Limited. Antibiotic substances B-41, their production and their use as insecticides and acaricides. 3,998,699, Cl. 195-80.00R.

Aoki, Keiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Feedback air-fuel ratio regulator. 3,998,189, Cl. 123-32.0EA.

Aoki, Osamu, to Shikoku Kenki Kabushiki Kaisha. Wheeled vehicle for conveying loads. 3,998,288, Cl. 180-26.00R.

Aono, Masami, to Tokico Ltd. Brake shoe clearance automatic adjusting device. 3,998,297, Cl. 188-79.5GT.

Arai, Michio, to Sony Corporation. Field effect transistor with a carrier injecting region. 3,999,207, Cl. 357-22.000.

Arai, Michio: *See—*
Tomibe, Shinji; Arai, Michio; and Higashi, Kiyoshi, 3,998,585.

Araya, Kenzo; and Hashimoto, Takashi, to Tanaka Seiki Co., Ltd. Card sorting apparatus. 3,998,329, Cl. 209-74.00M.

Archey, William Bogan; Audi, Ronald Dominic; Clark, Roger James; and Redmond, Robert James, to International Business Machines Corporation. Liquid encapsulated integrated circuit package. 3,999,105, Cl. 317-100.000.

Arco Polymers, Inc.: *See—*
DiGiulio, Adolph V., 3,998,907.

Arena, John P., to Raymond Lee Organization, Inc., The, a part interest. Manually pressurizable spray dispenser. 3,998,361, Cl. 222-182.000.

Argoudelis, Alexander D.; and Reusser, Fritz, to Upjohn Company, The. Process for producing antibiotic U-51,640. 3,998,698, Cl. 195-80.00R.

Armour Pharmaceutical Company: *See—*
Rubino, Andrew M., 3,998,788.

Armstrong, Colin; Nicks, Peter Francis; and Walbridge, Derek John, to Imperial Chemical Industries Limited. Photocurable pigmented coating compositions. 3,998,979, Cl. 427-54.000.

Armstrong, Edward T., to TII Corporation. System for pollution suppression. 3,998,714, Cl. 210-62.000.

Arnold, Vernon W.; and Lee, Robert J., to Standard Oil Company. Oil fracturing spacing agents. 3,998,744, Cl. 252-8.55R.

Artzberger, Thomas, to Kelley Company, Inc. Dockboard having improved lip lifting mechanism. 3,997,932, Cl. 14-71.300.

Asahi-Dow Limited: *See—*
Iwami, Isamu; Kawasaki, Hironobu; and Hattori, Kenichi, 3,998,990.

Asahi Glass Co., Ltd.: *See—*
Oda, Yoshio; Uchida, Keiichi; Morimoto, Takeshi; and Kumai, Seisaku, 3,998,877.

Asato, Goro; and Bentley, Terence James, to American Cyanamid Company. Substituted tetrahydro-oxybenzothienylurea compounds as growth promoting agents for animals. 3,998,959, Cl. 424-275.000.

Ashland Oil, Inc.: *See—*
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Associated Mills, Inc.: *See—*
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Atkinson, Donald Alan, to Davy Ashmore International Limited. Furnace vessels. 3,998,440, Cl. 266-245.000.

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Attig, Donald B. Apparatus for removing sulfur dioxide and particulate matter from flue gases. 3,998,613, Cl. 55-256.000.

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Babenko, Vladimir Alexandrovich; Boeva, Galina Georgievna; Violin, Eduard Efimovich; Vodakov, Jury Alexandrovich; Ivanova, Eleonora Grigorievna; Kmita, Tatyana Georgievna; Pavlichenko, Vadim Ivanovich; Ryzhikov, Igor Veniaminovich; Kholuyanov, Georgy Fedorovich; Kruglov, Igor Ivanovich; Lomakina, Galina Alexandrovna; and Novikov, Vladimir Pavlovich. Semiconductor indicating device and method for production of same. 3,999,206, Cl. 357-17.000.

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Bailey, Ronald B., to General Electric Company. Gating signal control for a phase-controlled rectifier circuit. 3,999,111, Cl. 321-2.000.

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Bako, Lazlo, to Presto Lock Company, Division of Walter Kidde & Company, Inc. Draw bolt. 3,998,077, Cl. 70-74.000.

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Bargain, Michel. Heat-stable polyimide resins from bis-imide and aldehyde-azine. 3,998,787, Cl. 260-47.0CZ.

Barhorst, Ralph E., to Hobart Brothers Company. Square wave welding system. 3,999,034, Cl. 219-131.00R.

Barker, Rodney, to British Steel Corporation. Casting steel ingots. 3,998,261, Cl. 164-66.000.

Barnett, Norton C., to Admiral Homes, Inc. Collapsible mansard roof structure for transportable building. 3,998,013, Cl. 52-69.000.

Barouh, Victor; and Glenn, Robert. Impact typewriter correction tape and method of manufacture. 3,998,314, Cl. 197-181.000.

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apparatus for transferring particles from one fluid stream into another. 3,998,734, Cl. 210-65.000.
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Berg, Gerhard; Nordsiek, Karl-Heinz; Maahs, Gunter; and Schanzer, Wilhelm, to Chemische Werke Huls Aktiengesellschaft. Pourable elastomeric particles. 3,998,778, Cl. 260-33.6AQ.
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Bost, Curtis C.; Irwin, Eugene Scott; Keineth, Thomas M.; Russell, Robert Q.; Ince, Harsch C., Jr.; Parsons, Gary L.; and Turner, James Keith, to J. P. Stevens & Co., Inc.; and Gaston County Dyeing Machine Company. Apparatus for treatment of textile desizing effluent. 3,998,740, Cl. 210-195.00S.

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British Petroleum Company Limited, The: *See—*
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British Steel Corporation: *See—*
Barker, Rodney, 3,998,261.

Broggi, Renato; Libassi, Giuseppe; and Pifferi, Giorgio, to ISF S.p.A. 7-αHydrazinoacetamido derivatives of cephalosporanic. 3,998,950, Cl. 424-246.000.

Brondy Laboratories, Inc.: *See—*
Garrison, Lynn R., 3,998,214.

Brooks, Robert J.: *See—*
Real, Kenneth G.; Ellefson, Larry P.; and Brooks, Robert J., 3,998,154.

Brophy, William R.; and Dolson, Richard G., to Royal Business Machines, Inc. Roll fed copier. 3,998,118, Cl. 83-205.000.

Brouwer, Willem: *See—*
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Brown, George T., Jr.; Clark, Donald B.; and Koopman, Donald E., to Djinnii Industries, Inc. Solidification retardation of liquid crystalline compositions with steroid derivatives of isostearyl carbonate. 3,998,860, Cl. 260-397.200.

Brown, Michael K.; Maidment, Earl P.; Lundquist, David E.; and Shell, Ronald G., to Burroughs Corporation. Temperature control system for ink jet printer. 3,999,190, Cl. 346-140.00R.

Brown, Robert Saul; Eschenbach, Paul W.; and King, Herbert Ray, to Deering Milliken Research Corporation. Circular knitting machine quick drive disconnect. 3,998,075, Cl. 66-149.00R.

Broxholm, Thomas M.; and Elmore, Lester C., to Pulsepower Systems, Incorporated. Modular liquid propellant gun. 3,998,129, Cl. 91-39.000.

Brozkova, Marie: *See—*
Ripka, Josef; Ohlidal, Vladimir; Vobornik, Vaclav; Junek, Jan; Hortlik, Frantisek; Jaros, Frantisek; Mares, Karel; Celerin, Pavel; Kotrba, Zdenek; Brozkova, Marie; and Lihtarova, Ludmila, 3,998,040.

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Bryant, Miles Talmadge: *See—*
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Bucalo, Louis. Structures for growing cultures within human and animal bodies. 3,998,211, Cl. 128-2.00F.

Buchholz, Arnold R.: *See—*
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Buck, George S., Jr.; and Russell, Roger, to Cotton Incorporated. Batt forming and feeding apparatus. 3,997,942, Cl. 19-155.000.

Buck, George S., Jr.; and Russell, Roger, to Cotton Incorporated. Cotton packaging method and apparatus. 3,998,150, Cl. 100-269.00R.

Budden, Renke: *See—*
Milkowski, Wolfgang; Budden, Renke; Funke, Siegfried; Huschens, Rolf; Liepmann, Hans-Gunther; Stuhmer, Werner; and Zeugner, Horst, 3,998,809.

Budzich, Tadeusz. Load responsive fluid control valves. 3,998,134, Cl. 91-412.000.

Bumgardner, Jon H., to United States of America, Navy. Automatic threshold circuit. 3,999,083, Cl. 307-235.00J.

Bunas, Bennie I.; and Kellar, James S., to Universal Oil Products Company. Hydrocarbon deasphalting process and solvent extractor therefor. 3,998,726, Cl. 208-309.000.

Bunker Ramo Corporation: *See—*
Mathe, Istvan, 3,998,518.
McCaughey, William Stephen, 3,997,955.

Burch, James Morriss; and Williams, David Charles, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Optical alignment techniques. 3,998,554, Cl. 356-138.000.

Burkhard; Hermann; Entschel, Roland; and Steinemann, Willy, to Fidelity Union Trust Company, Executive Trustee Under the Sandoz Trust. 5-Arylazo-6-hydroxy-pyridone-2 dyes containing an amino or substituted amino group. 3,998,803, Cl. 260-156.000.

Burkhardt, Lieselotte; Schuster, Wilhelm; and Stuck, Walter, to Wolkro Aktiengesellschaft. Method for producing a tire-mounted anti-skid device. 3,998,981, Cl. 427-171.000.

Burleigh, John E.: *See—*
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Buro, Paul, to U.S. Philips Corporation. Graphic recording device. 3,999,189, Cl. 346-139.00C.

Burroughs Corporation: *See—*
Brown, Michael K.; Maidment, Earl P.; Lundquist, David E.; and Shell, Ronald G., 3,999,190.
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Burroughs Wellcome Co.: *See—*
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Burton, Gilbert W.: *See—*
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Burton, John S.: *See—*
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Buss, Dennis Darcy, to Texas Instruments Incorporated. Transversal frequency filter. 3,997,973, Cl. 333-70.00T.

Buss, Russel A.; Cox, Ralph; and Palmer, Jim B., to Phillips Petroleum Company. Polymerization method and apparatus. 3,998,995, Cl. 526-59.000.

Butte, Walter Albert, Jr.; and Murtaugh, William J., to Sun Ventures, Inc. Hydrogenation of phthalonitriles using rhodium catalyst. 3,998,881, Cl. 260-563.00R.

Buxbaum, Lothar, to Ciba-Geigy Corporation. Process for the manufacture of stabilized polyester-polycarbonate copolymers. 3,998,908, Cl. 260-860.000.

C. Evans & Sons Limited: *See—*
Gostling, Peter Eric, 3,998,562.

C. G. Doris (Compagnie Generale pour les Developement Operationnels des Richesses Sous-marines): *See—*
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C. I. Industries, Inc.: *See—*
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C. L. Frost & Son, Inc.: *See—*
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Cagan, Robert H.; Kare, Morley R.; and Morris, James A., to University of Pennsylvania, The Trustees of the. Monellin, a sweet polypeptide derived from fruit of dioscoreophyllum cumminsii. 3,998,798, Cl. 260-112.00R.

Cahn, Robert P.; and Nicholson, Edward W. Energy storage by means of low vapor pressure organic heat retention materials kept at atmospheric pressure. 3,998,695, Cl. 176-39.000.

Caldwell, Hamlin A., Jr.; and Mayer, Gerald M., to United States of America, Navy. Remote elevated platform. 3,998,408, Cl. 244-138.00R.

Call, Bruce L.: *See—*
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Callaghan, James M. Fiber-optic photoelectric power control device. 3,999,074, Cl. 250-551.000.

Cam Gears Limited: *See—*
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Camin Industries Corporation: *See—*
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Canada Square Management Ltd.: *See—*
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Canadian General Electric Company Limited: *See—*
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Canadian Industries, Ltd.: *See—*
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Cannalonga, Marco Alfred: *See—*
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Cannon, Cyril George; and Carter, John Anthony, to Imperial Chemical Industries Limited. Former for moulding flared skirts. 3,998,366, Cl. 223-68.000.

Canon Kabushiki Kaisha: *See—*
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Iwashita, Tomonori; Ohtaki, Shohei; Kozuki, Susumu; Date, Nobuaki; and Nakamoto, Soichi, 3,999,197.
Katayama, Hajime; Miyamoto, Koichi; and Ohashi, Shoji, 3,997,977.
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Cappelli, Antonio: *See—*
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Caragliano, Edward S.; and Nick, Howard H., to International Business Machines Corporation. Miniaturized strip-line directional coupler package having spirally wound coupling lines. 3,999,150, Cl. 333-10.000.

Carl Freudenberg, Firma: *See—*
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Carlier, Claude, to Societe Anonyme Saunier Duval. Vacuum-pressure sending and receiving station for pneumatic tube carrying installations. 3,998,405, Cl. 243-19.000.

Carlson, Bernard C., to R. T. Vanderbilt Company, Inc. Thickening composition. 3,998,973, Cl. 424-357.000.

Carlson, Robert C., to Minnesota Mining and Manufacturing Company. Sulfonated aromatic polyisocyanates and preparation of stable anionic polyurethane or polyurea latices therefor. 3,998,870, Cl. 260-470.000.

Carlson, Robert C., to Minnesota Mining and Manufacturing Company. Sulfonated isocyanate compositions. 3,998,871, Cl. 260-470.000.

Carlsson, Per Arvid Emil: *See—*
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Brandstrom, Arne Elof; Carlsson, Per Arvid Emil; Carlsson, Stig Ake Ingemar; Corrodi, Hans Rudolf; Ek, Lars; and Ablad, Bengt Arne Hjalmar, 3,998,790.

Carson, John Robert, to McNeil Laboratories, Incorporated. Uncatalyzed aroylation of 1-alkylpyrrole-2-acetic acid derivatives. 3,998,844, Cl. 260-326.470.

Carter, John Anthony: *See—*
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Carty, Richard L.; and Becklund, Iver F. Electro-pneumatic action for player piano. 3,998,122, Cl. 84-125.000.

Case, James E.; and Ruppert, Richard L. Apparatus for releasing tilt-up panel hoisting. 3,997,959, Cl. 29-244.000.

Casio Computer Co., Ltd.: *See—*
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Caspar, Jean-Pierre: *See—*
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Cass, Eugene E., to International Business Machines Corporation. Wireable planar integrated circuit chip structure. 3,999,214, Cl. 357-45.000.

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Durgan, Virgil R. C., 3,998,488.
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Klett, Gene R., 3,997,988.
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Celotex Corporation, The: *See—*
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Cenker, Moses: *See—*
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Ceribelli, Giorgio. Device for wire-binding bales of incoherent material, such as straw, hay, etc. and feeding apparatus for such a device. 3,998,147, Cl. 100-11.000.

Cerutti, Richard L.; and Knavish, Leonard A., to PPG Industries, Inc. Vertical glassmaking furnace and method of operation. 3,998,619, Cl. 65-136.000.

Ceskoslovenska akademie ved: *See—*
Deml, Mirko; Bocek, Petr; and Janak, Jaroslav, 3,998,719.
Hrabak, Frantisek; Hynkova, Vlasta; and Bezdek, Milan, 3,998,910.
Marek, Miroslav; and Toman, Ludek, 3,998,713.

CHA Industries: *See—*
Mahl, Gunard O. B., 3,998,347.

Chadwick, Duane G. Egg cooking indicator and method of producing same. 3,998,099, Cl. 73-374.000.

Chamberlin, Earl. Video film projector. 3,998,533, Cl. 352-184.000.

Chandross, Edwin Arthur; and Pryde, Coralie Anne, to Bell Telephone Laboratories, Incorporated. Electrical device having a metal surface bearing a corrosion inhibitor. 3,998,993, Cl. 428-461.000.

Chang, Clarence D.; Lang, William H.; and Silvestri, Anthony J., to Mobil Oil Corporation. Manufacture of gasoline. 3,998,898, Cl. 260-668.00R.

Chang, Mike F.; Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Uniform migration of an annular shaped molten zone through a solid body. 3,998,661, Cl. 148-1.500.

Chang, Mike F.: *See—*
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Charles F. Smith and Son, Inc.: *See—*
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Chase, John Donald: *See—*
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Chassagne, Pierre J.: *See—*
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Chaudhry, Mohammad Saeed, to International Business Machines Corporation. Apparatus for recording data in arabic script. 3,998,310, Cl. 197-1.00A.

Chemetron Corporation: *See—*
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Chemische Werke Huls Aktiengesellschaft: *See—*
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Chen, Chia M.: *See—*
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Chen, Chin Hsin, to Eastman Kodak Company. Introducing Δ^{11} unsaturation into steroid compounds. 3,998,859, Cl. 260-397.100.

Cheung, Nelson, to Signode Corporation. Strap tensioning tool with load-sensing handle. 3,998,429, Cl. 254-79.000.

Chevrolet, Gerard; Guignard, Claude; and Poull, Maurice, to SA des Cableries et Trefileries de Cossonay; Kabelwerke Brugg A.G.; and Societe d'Exploitation des Cables Electriques Systeme Berthoud Borel & Cie, part interest to each. Telecommunication cable resistant to water penetration. 3,999,003, Cl. 174-23.00R.

Chevron Research Company: *See—*
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Chiarotto, Romeo, to Forniture Industriali Padova - S.p.A. Steel bearings with polychloroprene and fluorocarbon resin. 3,998,499, Cl. 308-3.00R.

Chicago Bridge & Iron Company: *See—*
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Chigarev, Valery Vasilievich: *See—*
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Chikuma, Toichi. Fire detector. 3,999,079, Cl. 307-117.000.

Chilton, George. Disposable thermometer. 3,998,098, Cl. 73-356.000.

Chiquiar-Arias, Marcelo. Disposable self-destructible syringes which render themselves unreusable. 3,998,224, Cl. 128-218.00R.

Chirino, Octavio I.; Hromek, Joseph; Joshi, Kailash C.; and Phillips, George C., Jr., to International Business Machines Corporation. Multilayer ceramic substrate structure. 3,999,004, Cl. 174-68.500.

Chirnside, William. Fan delay humidistat. 3,998,068, Cl. 62-186.000.

Chisholm-Ryder Company, Inc.: *See—*
Jarrell, Virgil N., 3,998,036.
Towson, Arthur L., Jr., 3,998,035.

Chitwood, Byron W.; and Keene, Kendall E., to Reed Tool Company. Earth boring auger. 3,998,283, Cl. 175-335.000.

Chladil, Joseph J., Sr.: *See—*
Bastiaans, Cedric R.; and Chladil, Joseph J., Sr., 3,999,020.

Chodil, Gerald Joseph, to Zenith Radio Corporation. Cathodoluminescent gas discharge device with improved modulation characteristics. 3,999,094, Cl. 313-192.000.

Chow, Pei. Method for forming electrically-isolated regions in integrated circuits utilizing selective epitaxial growth. 3,998,673, Cl. 148-175.000.

Christ, Alfred; and Lehmann, Rolf, to Escher Wyss Limited. Temperature-controlled roll for a rolling mill. 3,997,953, Cl. 29-116.0AD.

Christensen, Lyle E.; and Soucie, C. Dana, to BeMor International, Inc. Hand winding device. 3,998,402, Cl. 242-106.000.

Christensen, Nils J.: *See—*
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Christensen, Wynn L., to Bennett, Arthur A., Jr. Electronic system for article dispensing apparatus. 3,998,356, Cl. 221-2.000.

Christiansen, Walter: *See—*
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Christmann, Harold F.; and Miklas, Edward J., to Petro-Tex Chemical Corporation. Modified zinc ferrite oxidative dehydrogenation catalysts. 3,998,760, Cl. 252-471.000.

Chromalloy American Corporation: *See—*
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Karrer, Friedrich; and Farooq, Saleem, 3,998,891.
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Ciurca, Samuel J.; and Brault, Albert T., to Eastman Kodak Company. Photographic elements containing N-oxide oxidants. 3,998,640, Cl. 96-54.000.

Clark, Donald B.: *See—*
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Clark, Robert O. Solar energy apparatus and method. 3,998,056, Cl. 60-641.000.

Clark, Roger James: *See—*
Archey, William Bogan; Audi, Ronald Dominic; Clark, Roger James; and Redmond, Robert James, 3,999,105.

Clarke, Jim. Resilient frame construction for displaying transparencies. 3,998,535, Cl. 353-84.000.

Clayton Environmental Consultants, Inc.: *See—*
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Clayton Manufacturing Company: *See—*
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Cleer, Clarence W., Jr.; and Wilson, Gerald M. Cast venting apparatus. 3,998,220, Cl. 128-91.00R.

Clemison, Arden L. Auxiliary holder. 3,998,421, Cl. 248-441.00B.

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Anthony, Thomas R.; Cline, Harvey E.; and Houston, Douglas E., 3,998,662.
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Clyde, Robert A. Supported catalyst. 3,998,758, Cl. 252-466.00J.

Cobb, Raymond L., to Phillips Petroleum Company. 13-Oxatetracyclo[8.2.1^{2,9}.0.0^{3,8}]tridec-5-ene-1,5,6,10-tetracarbonitrile. 3,998,853, Cl. 260-346.20M.

Cobb, Raymond L.: *See—*
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Cochran, Larry Allen; and Harwood, Leopold Albert, to RCA Corporation. Controllable gain signal amplifier. 3,999,141, Cl. 330-29.000.

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Cogley, James Joseph: *See—*
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Coleman, Trevor Norman; Skinner, Dennis Edward; and Webster, Kenneth Charles Joseph, to USM Corporation. Pad box for accommodating different shoe bottoms. 3,997,931, Cl. 12-38.000.

Coley, Kenneth R.: *See—*
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Ponikelsky, Zdenek; and Collignon, Gerard M. G. J., 3,998,286.

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Collins, Robert F., to Kendall Company, The. Table drape assembly and method. 3,998,221, Cl. 128-132.00D.

Collins, Terence J., to Qonaar Corporation. Turnstile head mechanism construction. 3,998,008, Cl. 49-47.000.

Colombo, Paolo: *See—*
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Combustion Engineering, Inc.: *See—*
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Cominco Ltd.: *See—*
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Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
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Compagnie Honeywell Bull (Societe Anonyme): *See—*
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Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
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Compton, John R., to Westinghouse Electric Corporation. Missing phase detection circuit for use with three-phase power sources. 3,999,087, Cl. 307-295.000.

Compudrive Corporation: *See—*
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Condie, Richard M.; and Toledo-Pereyra, Luis H., to University of Minnesota, The Regents of the. Fibrinogen-free plasminogen-plasmin-free plasma and method of preparing and using same. 3,998,946, Cl. 424-101.000.

Conlee, Charles J.: *See—*
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Connelly, Lawrence J.; and Ballweber, E. G., to Nalco Chemical Company. Method of hydrolyzing polyacrylamide. 3,998,777, Cl. 260-29.60E.

Conrow, Ransom Brown; and Bernstein, Seymour, to American Cyanamid Company. Complement inhibitors. 3,998,937, Cl. 424-273.000.

Consupak, Inc.: *See—*
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Conti, Paolo: *See—*
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Continental Oil Company: *See—*
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Umphrey, Ronald W.; and McCain, David L., 3,998,396.

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Cook, Barry, to Ciba-Geigy Corporation. Compositions stabilized with piperidine derivatives. 3,998,784, Cl. 260-45.75N.

Cooke, Claude E., Jr.; Graham, John W.; and Muecke, Thomas W., to Exxon Production Research Company. Multiple fracturing of subterranean formations. 3,998,271, Cl. 166-280.000.

Cooper, Rey W.: *See—*
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Cooper, Stephen Robert. Vehicle parking guide. 3,998,285, Cl. 180-1.0AP.

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Coraor, George R.; Jackson, Harold L.; and Mader, Frederick W., to Du Pont de Nemours, E. I., and Company. Process for continuously transferring heat to a moving band. 3,998,588, Cl. 8-176.000.

Corley, William G., to Ex-Cell-O Corporation. Honing tool. 3,998,011, Cl. 51-338.000.

Cornell, Cyrus J. Mutliple rip-sawing method and apparatus. 3,998,115, Cl. 83-56.000.

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Costa, Peter F.; Finnemore, Frederick M.; Hendry, Donald H.; and Johnson, Bruce K., to Polaroid Corporation. Mirror mount for photographic optical system. 3,999,201, Cl. 354-288.000.

Cothran, Martin D.; O'Kelly, Lewis J.; and Hall, Russell L., to Docutel Corporation. Depository system. 3,998,155, Cl. 101-110.000.

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Buck, George S., Jr.; and Russell, Roger, 3,998,150.

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Cox, Ralph: *See—*
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Crane, Carl Joseph. Aircraft visual approach/landing reproducer device and system. 3,999,007, Cl. 358-104.000.

Cranston, Benjamin Howell; Hornig, Carl Frederick; and Machusak, Donald Arthur, to Western Electric Company, Inc. Method of forming a laminate. 3,998,374, Cl. 228-107.000.

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Cresswell, Ronald M.; Mentha, John W.; and Seaman, Russell L., to Burroughs Wellcome Co. Process for preparing β-amino-α-benzylacrylonitriles. 3,998,814, Cl. 260-240.00R.

Crinkelmeyer, Oliver W., to Dow Chemical Company, The. Hydraulic cement composition. 3,998,773, Cl. 260-29.2EP.

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Crounse, Nathan Norman; and Schmidt, Paul Joseph, to Sterling Drug Inc. Triazinyl-benzofluorans. 3,998,825, Cl. 260-249.500.

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Cuff, Calvin I. Device for converting rotary motion into a unidirectional linear motion. 3,998,107, Cl. 74-84.00S.

Culligan, Robert L. Sunbathing mat assembly. 3,997,927, Cl. 5-344.000.

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Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Preparation of quinoline derivatives. 3,998,831, Cl. 260-289.00H.

Curran, Edward T., to United States of America, Air Force. Reverse flow aft inlet ramjet system. 3,998,050, Cl. 60-245.000.

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Czerner, Peter Alfred; and Szymansky, Edward, to Sperry Rand Corporation. Switch arrangement for hand-held portable electrical appliances. 3,997,968, Cl. 30-43.920.
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Dalmasso, Ginette Laure, to Compagnie Honeywell Bull (Societe Anonyme). Interface for connecting a data-processing unit to an automatic diagnosis system. 3,999,053, Cl. 235-153.00A.
Damour, Lawrence R. Automatically closed couplings. 3,998,560, Cl. 403-26.000.
D'Antonio, Joseph V.; D'Antonio, Lawrence E.; D'Antonio, Nicholas F.; and Bates, Richard L. Apparatus for holding a bag open. 3,998,415, Cl. 248-101.000.
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DeBaun, Jack R.; Pallos, Ferenc M.; and Teach, Eugene G., to Stauffer Chemical Company. N,N-dimethyl-N'-phenylthiocarbamyl formamidine and its use as an anti-inflammatory agent. 3,998,970, Cl. 424-326.000.
De Bernardo, Silvano; and Weigele, Manfred, to Hoffmann-La Roche Inc. Process for preparing pyrazomycin and pyrazomycin B. 3,998,999, Cl. 536-1.000.
De Boer, Jan, to U.S. Philips Corporation. Dry shaver with an extendible trimmer. 3,997,967, Cl. 30-34.100.
de Bruyne, Norman Adrian. Oscillating stirrers. 3,998,435, Cl. 259-114.000.
Decker, Hanns; and Jakobs, Willy, to Klockner-Humboldt-Deutz Aktiengesellschaft. Mechanism for degasification of a viscous liquid by means of centrifugal action. 3,998,382, Cl. 233-7.000.
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de Jongh, Hendrik Paul, to Akzona Incorporated. Process for the preparation of 11β-hydroxy-18-alkyl-estrane compounds. 3,998,813, Cl. 260-239.55C.
Delahaye, Henri; Fabre, Fernand; and Guerrera, Lucien, to Produits Chimiques Ugine Kuhlmann. Non-rigid connection for circular pipes. 3,998,477, Cl. 285-93.000.
Delet, Victoria. Backless brassiere. 3,998,231, Cl. 128-476.000.
Delp, Tony M., to Rockwell International Corporation. Thumbwheel rotary wafer switch having odd number detent positions and rotary wafer printed circuit pattern. 3,999,021, Cl. 200-11.0DA.
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DeMarinis, Robert M., to SmithKline Corporation. Trifluoroethyl-mercapto, -sulfinyl or -sulfonyl acetamidocephalosporins. 3,998,819, Cl. 260-243.00C.
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Dempsey, Douglas E.; and Herndon, Gerald F., to Pepsico, Inc. Tennis racket. 3,998,457, Cl. 273-73.00C.
Demsky, Herbert M.; Mathisen, Einar S.; Owen, Theodore R.; and Tong, Alvin H., to International Business Machines Corporation. Spectrophotometer for dual mode fluorescence analysis. 3,999,062, Cl. 250-227.000.
Dendy, King Hubert; and Leskin, Morton B., to Leskin, Morton B. Lamp power supply using a switching regulator and commutator. 3,999,100, Cl. 315-308.000.
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Dey, Arabinda N., to P. R. Mallory & Co., Inc. High voltage organic electrolyte batteries. 3,998,658, Cl. 429-194.000.
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Dorr, Irene M. Barrette with swiveled hinge. 3,998,233, Cl. 132-48.00A.
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Dutot, Christian; and Dumontier, Jean Michel, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Easy-fit signal unit for motor vehicles. 3,998,178, Cl. 116-28.00R.
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Edgerton, C. Willis, Jr.; and Copeland, Lynn L., to Edgerton, C. Willis, Jr. Waterproof container for goods. 3,998,304, Cl. 190-48.000.
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Ellis, Harold (Hal), to Delphic Research Laboratories, Inc. Heating

device containing electrically conductive composition. 3,999,040, Cl. 219-543.000.

Elmeg Elektro-Mechanik GmbH: *See—*
Reuting, Hans-Werner, 3,999,107.

Elmore, Lester C.: *See—*
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EMI Limited: *See—*
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Engins Matra: *See—*
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England, Robert W. Bed with automatic tilting occupant support. 3,997,926, Cl. 5-62.000.

Enoguchi, Yuji: *See—*
Wada, Kenichi; Enoguchi, Yuji; Ogawa, Masaya; Kawabata, Hidetoshi; Kurita, Takaji; Tanaka, Susumu; Fujiwara, Takao; and Murasaki, Hiroshi, 3,998,584.

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Ercoli, Alberto; and Da Col, Marco, to Lark S.p.A. Process for the preparation of 17-acyl esters of 17α, 21-dihydroxysteroids of the pregnane series and novel products. 3,998,701, Cl. 195-51.00S.

Erhardt, Heinrich S.; and Chu, Mosi, to Sperry Rand Corporation. High frequency power integrating printer. 3,998,153, Cl. 101-93.480.

Ernst, Richard Edward; Amini, Bijan; and Bareford, William John, to Du Pont de Nemours, E. I., and Company. Process for regenerating hydrogenation catalyst activity in hydrogen peroxide synthesis. 3,998,936, Cl. 423-588.000.

Eschenbach, Paul W.: *See—*
Brown, Robert Saul; Eschenbach, Paul W.; and King, Herbert Ray, 3,998,075.

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Lehmann, Rolf; and Siegfried, Armin, 3,997,952.
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Eschler, Hans, to Siemens Aktiengesellschaft. Linear data input transducer. 3,998,521, Cl. 350-3.500.

Eskedal, Ole: *See—*
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Etat Francais: *See—*
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Eto, Yoshizumi: *See—*
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Evans Products Company: *See—*
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Evans, Ralph Carlysle. Mosquito trap. 3,997,999, Cl. 43-107.000.

Evdokimenkov, Nikolai Pavlovich: *See—*
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Exxon Production Research Company: *See—*
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Fabian, Klaus: *See—*
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Fabre, Fernand: *See—*
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Faiczak, John, to Canada Square Management Ltd. Temperature control system. 3,998,267, Cl. 165-48.000.

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Falke, Jay F., to Sundstrand Corporation. Valve retainer. 3,998,571, Cl. 417-569.000.

Fane, William J., to Norris Industries, Inc. Frangible construction lock system. 3,998,080, Cl. 70-338.000.

Fanica, Stefan: *See—*
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Farabaugh, Aloysius W., to PPG Industries, Inc. Manufacture of flat glass having controlled width and nip width. 3,998,616, Cl. 65-29.000.

Farelli, Mario. Security cap for the fuel filling conduit of a motor vehicle. 3,998,353, Cl. 220-210.000.

Farooq, Saleem; and Karrer, Friedrich, to Ciba-Geigy Corporation. Diphenyl derivatives. 3,998,972, Cl. 424-337.000.

Farooq, Saleem: *See—*
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Farrell, John Jerome, to Consupak, Inc. Temperature controlled core rod. 3,998,577, Cl. 425-387.00B.

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Fasimpaur, James J.: *See—*
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Faul, William Henry; and Franchino, Harry David, to Eastman Kodak Company. Process for producing positive color diffusion transfer images using redox dye releasers. 3,998,637, Cl. 96-3.000.

Faulhaber, Fritz. Headlight. 3,999,056, Cl. 240-41.00R.

Fawcett, Derek James, to Lewmar Marine Limited. Winch. 3,998,431, Cl. 254-150.00R.

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Feix, Rudolf A. Apparatus for mixing materials in molding machines. 3,998,439, Cl. 259-192.000.

Feldman, Martin; and White, Donald Lawrence, to Bell Telephone Laboratories, Incorporated. Methods for determining feature-size accuracy of circuit patterns. 3,998,639, Cl. 96-36.200.

Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung: *See—*
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Felten & Guilleaume Kabelwerke AG: *See—*
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Feneis, Thomas John, Jr.; and Bryant, Miles Talmadge, to Mobil Oil Corporation. Water-based epoxy resin zinc-rich coating compositions. 3,998,771, Cl. 260-18.0PN.

Fennell, Robert D., to Motorola, Inc. Monolithic alternately stacked IF amplifier. 3,999,139, Cl. 330-16.000.

Fernandez, D. Julio Antonio Garcia, to Mackina Westfalia, S.A. & Corsan. Continuous shoring machines for tunnel construction. 3,998,067, Cl. 61-85.000.

Fiat Societa per Azioni: *See—*
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Fidelity Union Trust Company, Executive Trustee Under the Sandoz Trust: *See—*
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Filminiature Systems, Inc.: *See—*
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Findley, Gerald Ivan; Cummings, Kenneth Dean; and Anderson, Teddy Lee, to International Business Machines Corporation. Intermixed pitches in a buffered printer. 3,999,168, Cl. 340-172.500.

Finigan, James J.: *See—*
Siciliano, George R.; Simpson, Verne G.; and Finigan, James J., 3,998,865.

Fink, Richard R. Tape reel with tape-attaching mechanism. 3,998,401, Cl. 242-74.100.

Finnemore, Frederick M.: *See—*
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Finnemore, Harlan E., to Air Preheater Company, Inc., The. Compartment support for vertical shaft air preheater. 3,998,266, Cl. 165-8.000.

Firestone Tire & Rubber Company, The: *See—*
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Fischer, Klaus; and Ringel, Josef, to VEB Filmfabrik Wolfen-Fotochemisches Kombinat. Method for the production of cellulose fibers using a two-step pre-treatment. 3,998,688, Cl. 162-50.000.

Fischer, Martin: *See—*
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Fischman, Martin; and L'Hommedieu, Jesse H., to GTE Sylvania Incorporated. Horizontal deflection system. 3,999,101, Cl. 315-408.000.

Fishman, Josif Davydovich: *See—*
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Flaherty, Edward J. Flag waving unit. 3,997,993, Cl. 40-218.000.

Fleagle, Joseph Edgar, to Wagner Electric Corporation. Antilock sensor assembly. 3,998,298, Cl. 188-181.00R.

Fleischman, Andor A., to Bell & Howell Company. 7mm Ultrafiche lens. 3,998,528, Cl. 350-176.000.

Fleischman, Andor A., to Bell & Howell Company. Microfilm recorder lens. 3,998,529, Cl. 350-216.000.

Flemmig, Karl-Heinz: *See—*
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Flex-O-Lators, Inc.: *See—*
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Flint, Theodore R. Method of fabricating insulating glass units. 3,998,680, Cl. 156-109.000.

Florence, Jack M.; and Smith, William E., to Owens-Illinois, Inc. Aluminum metaphosphate dopant sources. 3,998,668, Cl. 148-22.000.

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Foerster, Hans: *See—*
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Follain, Gerard; and Bresson, Eugene, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Automatic regulation system for a distillation unit. 3,998,704, Cl. 202-160.000.

Fong, Jaan-Jiue, to Minnesota Mining and Manufacturing Company. Cadmium electroplating process and bath therefor. 3,998,707, Cl. 204-50.00R.

Foral, Thomas: *See—*
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Foreman, Robert E.; and Strozewski, Casimir S., to Sterilaire Medical, Inc. Air circulating system for ultra clean areas. 3,998,142, Cl. 98-36.000.

Forman, Paul F.: *See—*
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Forrest, Charles D., to Teledyne McCormick Selph. Apparatus for manufacture of sensitized fine particle penetaerythritol tetranitrate. 3,998,597, Cl. 23-266.000.

Forrest, Thomas Percy; Soper, William Ernest; and McKenzie, Donald, to United States of America, Army. Missile warheads. 3,998,162, Cl. 102-56.0SC.

Fors, Vernen E. Cargo moving apparatus for trucks. 3,998,343, Cl. 214-518.000.

Forsythe, Theresa M.: *See—*
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Forward, John E.: *See—*
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Foster, Alan W., to Petro-Tex Chemical Corporation. Lithium ferrite oxidative dehydrogenation catalysts. 3,998,757, Cl. 252-465.000.

Foster, Alan W.; and Besozzi, Alfio J., to Petro-Tex Chemical Corporation. Purification of unsaturated compounds. 3,998,902, Cl. 260-680.00E.

Foster, Billy E., to United States of America, Energy Research and Development Administration. High speed radiation scanning technique for simultaneously determining the pitch and eccentricity of an encased oil. 3,999,067, Cl. 250-312.000.

Foster Wheeler Energy Corporation: *See—*
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Frandsen, LeRoy, to H. H. Robertson Company. Double-skin insulated building panel. 3,998,024, Cl. 52-595.000.

Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H.: *See—*
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Franzen, Volker; Ploetz, Theodor; Haupt, Ursula; and Solich, Edeltraud, to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung. Method of purifying the waste water of paper mills. 3,998,731, Cl. 210-32.000.

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Fried, John H.; and Harrison, Ian T., to Syntex Corporation. Anti-inflammatory, analgesic, anti-pyretic and anti-pruritic 6-substituted 2-naphthyl acetic acid derivative-containing compositions and methods of use thereof. 3,998,966, Cl. 424-308.000.

Fried, Reinhard, to BBC Brown Boveri & Company Limited. Pressure exchanger cell ring and improved cell wall construction therefor. 3,998,567, Cl. 416-189.000.

Friedman, Jerome. Rotary marking tool. 3,998,151, Cl. 101-6.000.

Frohn, Walter; and Rothbauer, Heinrich, to Incoplan GmbH. Machine for producing blown hollow plastic articles. 3,998,576, Cl. 425-326.00B.

Frost, Charles C.; and Weis, Siegfried K., to C. L. Frost & Son, Inc. Bearing housing assembly and method thereof. 3,998,505, Cl. 308-195.000.

Fruhwirt, Otto; Frey, Hellmuth; and Schmidhammer, Ludwig, to Wacker-Chemie GmbH. Process for the separation of chlorohydrocarbons from lower boiling impurities. 3,998,706, Cl. 203-7.000.

Frye, Helen G. Battery powered coffee maker. 3,998,143, Cl. 99-280.000.

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Fuchs, Francis J.; and Fuchs, Dorothy J. Floatable ball. 3,998,204, Cl. 126-270.000.

Fucito, Dermot Thomas, to Stromberg-Carlson Corporation. Low pass active filter apparatus. 3,999,137, Cl. 328-167.000.

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Fujibayashi, Kimiya. Cutting apparatus for a rod or wire material. 3,998,117, Cl. 83-199.000.

Fujimi, Yukio; and Miwa, Akihiro, to Kabushiki Kaisha Daini Seikosha. Printing or stamping device. 3,998,312, Cl. 197-55.000.

Fujimoto, Iwao: *See—*
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Fukase, Shigeo; and Kawabe, Ushio, to Hitachi, Ltd. Method of manufacturing thin-film field-emission electron source. 3,998,678, Cl. 156-3.000.

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Fukuda, Takeo; and Torii, Kenichi, to Tokyo Shibaura Electric Co., Ltd. Channel-selecting apparatus for multichannel receivers. 3,999,131, Cl. 325-453.000.

Fukuda, Yoshiharu; Onishi, Toshio; and Takeuchi, Akitoshi, to Onoda Cement Company, Ltd. Apparatus for treating by-product gypsum to be used as an inhibitor for setting of cement. 3,998,596, Cl. 23-262.000.

Fukumura, Masataka; Maeshima, Kaoru; and Okano, Shigeru, to Sumitomo Chemical Company, Limited. Process for producing cephalosporanic acid derivatives. 3,998,817, Cl. 260-243.00C.

Fuller, Oliver C., to Evans Products Company. Brake beam structure. 3,998,299, Cl. 188-223.100.

Fuller, Robert R., to Westinghouse Electric Corporation. Production of ammonium diuranate. 3,998,925, Cl. 423-15.000.

Fulton, Theodore Alan, to Bell Telephone Laboratories, Incorporated. Supercurrent devices having electrode configurations for moving vortices under magnetic field control. 3,999,204, Cl. 357-5.000.

Funk, L. Warren; and Schriber, Stanley O., to Atomic Energy of Canada Limited. Layered, multi-element electron-bremsstrahlung photon converter target. 3,999,096, Cl. 313-330.000.

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Furstenberg, Joachim, to LTG Lufttechnische GmbH. Method and apparatus for open-end spinning. 3,998,039, Cl. 57-58.950.
Fuss, LeRoy, III, to Scientific-Atlanta, Inc. Satellite tracking antenna apparatus. 3,999,184, Cl. 343-709.000.
G. D. Searle & Co.: *See—*
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Galer, Herbert W., to United States Steel Corporation. Plastic lids and pails. 3,998,355, Cl. 220-304.000.
Gandon, Louis; Demarthe, Jean-Michel; and Sonntag, Alain Alexandre, to Societe Miniere et Metallurgique de Penarroya. Method for selectively dissolving non-ferrous metals contained in pyritic ores. 3,998,628, Cl. 75-104.000.
Ganguly, Ashit K.: *See—*
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Garnier, Patrice. Device for clearing trays of collectivity restaurants before washing them. 3,997,933, Cl. 15-102.000.
Garrison, Lynn R., to Brondy Laboratories, Inc. Premature ventricular contraction detector and method. 3,998,214, Cl. 128-2.06A.
Gartz, Clarence A., Jr.; and Luhrs, Millen E., to Libbey-Owens-Ford Company. Glass melting furnace and method of operation. 3,998,615, Cl. 65-29.000.
Gary, Herbert H.; Bess, William; and Hubner, Frederick, to Bristol-Myers Company. Shampoo compositions containing beer solids. 3,998,761, Cl. 252-544.000.
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Gaynor, Edwin S. Photographic tray rocker. 3,998,434, Cl. 259-73.000.
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Genie Electronics Co., Inc.: *See—*
Snyder, Dennis G.; and Paules, Eugene H., 3,999,015.
Gent, Derek James; and Skelton, Dennis Charles Frederick, to U.S. Philips Corporation. Line deflection circuit arrangement. 3,999,102, Cl. 315-410.000.
George Kent Limited: *See—*
Rudd, Derek Austen, 3,998,375.
Gergokov, Izmail Makhmudovich: *See—*
Semenov, Alexandr Nikolaevich; Klorikian, Vazgen Khorenovich; Prostov, Nariman Alexandrovich; Khalyavkin, Mikhail Dmitrievich; Reznikov, Ilya Emmanuilovich; Gergokov, Izmail Makhmudovich; Gapanovich, Jury Matveevich; Evdokimenkov, Nikolai Pavlovich; and Fishman, Josif Davydovich, 3,998,066.
Gerro Holding Company Limited: *See—*
Rohland, Bernhard, 3,998,561.
Gey, Werner; and Langhauser, Wolfgang R., to Zimmer Aktiengesellschaft. Process for the production of linear polyesters. 3,998,793, Cl. 260-75.00R.
Gibbs, Dale S.: *See—*
Wagener, Earl H.; Wessling, Ritchie A.; and Gibbs, Dale S., 3,998,776.
Gibson, Charles Arnold, to Union Carbide Corporation. Catalytic conversion of phenol to cyclohexanol and/or cyclohexanone. 3,998,884, Cl. 260-586.00P.
Gibson, Christian D.; Allen, Ralph E.; and Peters, Donald G., to Raymond Corporation, The. Material handling apparatus. 3,998,346, Cl. 214-730.000.
Gibson, Kirkland H., to H. G. P. Corporation. Method of treating large diameter yarns to provide bulking dyed and/or mottled effects in fabric. 3,997,950, Cl. 28-72.160.
Giffard, Philip John. Electrostatic separator. 3,998,727, Cl. 209-127.00R.
Giglia, Robert Domenico, to American Cyanamid Company. Edge lighted electrochromic displays. 3,998,525, Cl. 350-160.00R.
Gilbert, Donald E. Electrocution trap for insects. 3,998,000, Cl. 43-112.000.
Gilbert, Richard H.; and Griffith, Arvon M., to Abex Corporation. Manufacture of friction elements. 3,998,573, Cl. 425-117.000.
Gillette Company, The: *See—*
Mauleon, Diosdado M.; and Peper, Henry, Jr., 3,998,982.
Gilliams, Yvan Karel: *See—*
Van den Houte, Jozef Willy; Gilliams, Yvan Karel; and De Roo, Pierre Richard, 3,998,636.
Gilman, John J.; and Ropp, Richard C., to Allied Chemical Corporation. Optical convertor for laser systems. 3,999,145, Cl. 331-94.50P.
Gist-Brocades N.V.: *See—*
Nauta, Wijbe Thomas, 3,998,874.
Gittos, Maurice Ward; and Amey, David Anthony, to Aspro-Nicholas Limited. 4-Aminoalkyl-4-cyano-4-phenyl-butanoic acid esters. 3,998,965, Cl. 424-304.000.
Given, David A.: *See—*
Mowdood, Syed K.; and Given, David A., 3,998,997.
Glaxo Laboratories Limited: *See—*
Phillips, Gordon Hanley; Lawrence, Robin; Stephenson, Leslie; and Ayres, Barry Edward, 3,998,829.
Weir, Niall Galbraith, 3,998,821.
Glenn, Robert: *See—*
Barouh, Victor; and Glenn, Robert, 3,998,314.
Gliemeroth, Georg, to Jenaer Glaswerk Schott & Gen. Method of improving the mechanical strength of glass. 3,998,617, Cl. 65-33.000.
Glockner, Jorg: *See—*
Held, Franz; Glockner, Jorg; and Zimmer, Horst, 3,998,399.
Glorieux, Gilbert. Apparatus for asepticizing contact lens. 3,998,590, Cl. 21-89.000.
Gloss, Robert Andrew: *See—*
Lyness, Warren Irl; Gloss, Robert Andrew; and Bates, Norman Andrew, 3,998,690.
Godwin, James William: *See—*
Janowitz, Pedro Max; and Godwin, James William, 3,999,128.
Godwin, Robert H.: *See—*
Pinaire, Lon W.; Godwin, Robert H.; and Freeman, John M., 3,997,938.
Goffe, William L., to Xerox Corporation. Imaging system. 3,998,635, Cl. 96-1.0PS.
Goglia, Fred A.: *See—*
Allen, Albert J.; Davis, Arthur D.; Fasimpaur, James J.; Goglia, Fred A.; and Pike, Cecil A., 3,998,436.
Goldman, Jerome N.: *See—*
Goldman, Marvin A.; and Goldman, Jerome N., 3,998,242.
Goldman, Marvin A.; and Goldman, Jerome N., to Penn-Plax Plastics, Inc. Plastic gang valve assembly. 3,998,242, Cl. 137-608.000.
Goldstein, Herbert J.; and Li, Hsiao-Jun, to Texas-U.S. Chemical Company. Emulsion process for sulfolene and sulfolane products. 3,998,845, Cl. 260-332.100.
Goltz, Richard. Clamping fixture. 3,998,445, Cl. 269-258.000.
Gomez, Edward G.: *See—*
Harris, Arthur M., 3,998,226.

Gompf, Thomas E.: *See—*
Lau, Philip T. S.; Orvis, Roy L.; and Gompf, Thomas E., 3,998,642.

Gooding, David N.; and Shimp, Everett M., to International Business Machines Corporation. Upper bounds address checking system for providing storage protection for a digital data processor. 3,999,052, Cl. 235-153.0AM.

Goodman, David S.: *See—*
Anhalt, John W.; Goodman, David S.; and Alonso, Ocsar, 3,998,512.

Goodyear Tire & Rubber Company, The: *See—*
Mowdood, Syed K.; and Given, David A., 3,998,997.

Goott, Joseph. Poker type game apparatus. 3,998,462, Cl. 273-130.00H.

Gordon, Harvey. Adjustable wire shelf for frozen foods, and the like. 3,998,170, Cl. 108-91.000.

Gorresens Inc.: *See—*
Gottlieb, Steven, 3,998,649.

Gortsema, Frank P.: *See—*
Hawkins, Albert W.; O'Hara, Matthew J.; Gortsema, Frank P.; and Hedaya, Eddie, 3,998,180.

Goser, Karl; and Pomper, Michael, to Siemens Aktiengesellschaft. Static semiconductor storage element. 3,999,166, Cl. 340-173.0FF.

Gostling, Peter Eric, to C. Evans & Sons Limited. Supporting collar for use with builders scaffolding. 3,998,562, Cl. 403-235.000.

Goto, Satoru: *See—*
Miyao, Nobuaki; Kosuge, Kunihiro; Yoshida, Saijiro; Uchiyama, Kanaaki; Tanimoto, Hiroshi; Mimaki, Kazunao; and Goto, Satoru, 3,999,035.

Goto, Toshio, to Fuji Photo Film Co., Ltd. Film pack with light shielding means. 3,999,200, Cl. 354-277.000.

Goto, Toshio, to Fuji Photo Film Co., Ltd. Auto-process camera film processing apparatus. 3,999,202, Cl. 354-304.000.

Gottlieb, Steven, to Gorresens Inc. Process of manufacturing Portland cement clinker. 3,998,649, Cl. 106-100.000.

Gould Inc.: *See—*
Fedor, Robert Joseph, 3,998,599.

Gourdon, Claude; and Thivend, Jean. Clock signal regeneration system operating on ternary pulses. 3,999,135, Cl. 328-63.000.

Graf, Felix; Fluck, Jakob; and Schellenberg, Hans, to Rieter Machine Works, Ltd. False twist device and method of producing a textured yarn or the like. 3,998,041, Cl. 57-77.400.

Graham, John W.: *See—*
Cooke, Claude E., Jr.; Graham, John W.; and Muecke, Thomas W., 3,998,271.

Granger, Maurice; and Lerond, Andre, to Sebas S.A. Societe d'Exploitation d'Appareils Sanitaires. Apparatus for the simultaneous distribution and cutting of strips of rolled materials. 3,998,120, Cl. 83-335.000.

Grawey, Charles E.; and Groezinger, John J., to Caterpillar Tractor Co. Expandable tire rim arrangement and method of installation. 3,998,258, Cl. 152-405.000.

Grawey, Charles E.; Ball, Glenn A.; and Zook, Donald G., to Caterpillar Tractor Co. Method of making a portion of an hollow, annular, sand-core. 3,998,918, Cl. 264-109.000.

Gray, Archibald C.; and Van Aernum, Douglas I., to C. I. Industries, Inc. Continuous stack advancer for blank destacking. 3,998,448, Cl. 271-12.000.

Great Canadian Oil Sands Limited: *See—*
Opoku, Sam Kwame, 3,998,702.

Greek, John Charlie, Jr.; and Tanner, Howard Carl, to International Business Machines Corporation. Indicating entry into a variable width right margin zone. 3,998,311, Cl. 197-19.000.

Green, James E. Method and apparatus utilizing color algebra for analyzing scene regions. 3,999,047, Cl. 235-151.300.

Greene, Harold L. Vehicle operator alert sensor and alarm. 3,999,177, Cl. 340-279.000.

Greenleaf, John W., Jr. Sewage disposal system. 3,998,736, Cl. 210-104.000.

Grieshaber, Charles, to J. Bobst & Fils S.A. Device for regulating a feeding stroke. 3,998,452, Cl. 271-267.000.

Griffin, Richard H., to International Telephone and Telegraph Corporation. Multiple outlet electrical connector. 3,998,517, Cl. 339-164.00M.

Griffin, Rodney L.: *See—*
Nigro, George A., 3,998,238.

Griffith, Arvon M.: *See—*
Gilbert, Richard H.; and Griffith, Arvon M., 3,998,573.

Grim, Stig Henrik, to Siemens Aktiengesellschaft. Installation for producing radiological angiographic exposures. 3,999,044, Cl. 235-151.000.

Grimland, Charles J., to Micro Forms, Inc. Feed apparatus. 3,998,370, Cl. 226-150.000.

Griswold, Douglas A.; Ormsby, Harry L.; and Wilcox, Harold D., to Westinghouse Electric Corporation. Method of developing opaquely coated sensitized matrix with a solution containing sodium meta-silicate. 3,998,638, Cl. 96-36.100.

Groezinger, John J.: *See—*
Grawey, Charles E.; and Groezinger, John J., 3,998,258.

Grosjean, Henri; Lassechere, Jean; and Sigel, Pierre Louis, to Compagnie Honeywell Bull (Societe Anonyme). Device for accurately positioning a flexible strip with respect to an image. 3,998,369, Cl. 226-58.000.

Grosshennig, Gunther: *See—*
Mainka, Helmut; Schmidt, Hans; and Grosshennig, Gunther, 3,998,148.

Groth, Rolf, to Flachglas Aktiengesellschaft Delog-Detag. Resistance heated vaporizer. 3,999,039, Cl. 219-275.000.

Grotto, La Von P. Method and apparatus for cleaning cylindrical air filters. 3,998,656, Cl. 134-33.000.

Grove, Marvin H.; and Dunegan, Ronald G., to M & J Valve Company. Liquid meter prover apparatus. 3,998,089, Cl. 73-3.000.

Gruffaz, Max: *See—*
Balme, Maurice; and Gruffaz, Max, 3,998,904.

Grunwald, Frederick A., to Mead Johnson & Company. Arylsulfonylcarbamoyl-1,3-dicarbonylacyclic compounds. 3,998,879, Cl. 260-556.0AC.

GTE Automatic Electric Laboratories Incorporated: *See—*
Schmidt, Charles E., 3,999,154.

GTE Laboratories Incorporated: *See—*
Auborn, James J.; and Bezman, Richard D., 3,998,657.
Beaudette, Richard A., 3,999,084.
Lieberman, Sheldon I., 3,998,660.

GTE Sylvania Incorporated: *See—*
Fischman, Martin; and L'Hommedieu, Jesse H., 3,999,101.

Guerrera, Lucien: *See—*
Delahaye, Henri; Fabre, Fernand; and Guerrera, Lucien, 3,998,477.

Guignard, Claude: *See—*
Chevrolet, Gerard; Guignard, Claude; and Poull, Maurice, 3,999,003.

Guillermier, Bernard. Method for machining with a lathe and more particularly for copying and a tool-carrier making it possible to implement such a method. 3,998,113, Cl. 82-1.00C.

Gulf & Western Manufacturing Company: *See—*
Schumacher, John P.; and Hollenbeck, William F., 3,998,087.

Gumbusky, James T.: *See—*
Anderson, Clifford J.; and Gumbusky, James T., 3,998,215.

Gwynne, Thomas, to BPB Industries, Inc. Method of applying reinforcing strips to the edges of building boards. 3,998,679, Cl. 156-42.000.

Gyugyi, Laszlo, to Westinghouse Electric Corporation. Polyphase frequency converter. 3,999,112, Cl. 321-7.000.

Gyugyi, Laszlo; and Brennen, Michael B., to Westinghouse Electric Corporation. Method and control apparatus for static VAR generator and compensator. 3,999,117, Cl. 323-119.000.

H. G. P. Corporation: *See—*
Gibson, Kirkland H., 3,997,950.

H. H. Robertson Company: *See—*
Anderson, John W., 3,998,023.
Frandsen, LeRoy, 3,998,024.
Ting, Raymond M. L., 3,998,016.

Haacke, Gottfried, to American Cyanamid Company. Infrared reflective coating for visible light transmitting substrates. 3,998,752, Cl. 252-300.000.

Haber, William J.: *See—*
Paquette, Michael W.; Hess, John I.; and Haber, William J., 3,998,091.

Haberkorn, Egon; and Demandt, Siegfried, to W. Schlafhorst & Co. Coil transporting device. 3,998,397, Cl. 242-35.50A.

Habermeier, Jurgen; Batzer, Hans; and Porret, Daniel, to Ciba-Geigy Corporation. Polyglycidyl compounds containing hydantoin structure. 3,998,837, Cl. 260-309.500.

Hackney, Robert F., to West Point Pepperell, Inc. Tension control for continuous lengths of textile material. 3,998,368, Cl. 226-42.000.

Hadam, Wilhelm, to Lindauer Dornier Gasellschaft mbH. Clamping device at gripper heads for shuttleless looms. 3,998,251, Cl. 139-448.000.

Hadfield, Harry J., to United States of America, Army. Self-destruct delay fuze. 3,998,164, Cl. 102-81.200.

Haferkamp, Dirk; Hodzic, Alija; and Winter, Ulrich, to Hochtemperatur-Reactorbau GmbH. Nuclear powerplant with closed gas-cooling circuit. 3,998,057, Cl. 60-644.000.

Haffer, Gregor: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,998,847.

Haines, Walter E., to Estan Manufacturing Company. Method for forming a connection between two tubes. 3,998,376, Cl. 228-154.000.

Hairegenics, Inc.: *See—*
Miller, Paul W., 3,998,230.

Hale, James B.: *See—*
Myers, Edward; Hale, James B.; and Mentzer, James S., 3,998,379.

Hall, John B.; and Hruza, Denis E., to International Flavors & Fragrances Inc. Process for preparing one or more alkyl-2-methyl pentenoates by means of hydrogenation of one or more alkyl-2-methyl-3,4-pentadienoates. 3,998,873, Cl. 260-486.00R.

Hall, Jon, to Optivision Inc. Anamorphic enlarging system. 3,998,545, Cl. 355-52.000.

Hall, Russell L.: *See—*
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Halpern, William J.: *See—*
Milhous, Thomas E.; and Halpern, William J., 3,998,124.

Hamacher, Martin. Lighting structure. 3,999,057, Cl. 240-51.11R.

Hamamura, Kimio: *See—*
Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, 3,998,858.

Hamana, Isao: *See—*
Shimomai, Akiro; Fujimoto, Iwao; Hamana, Isao; and Katayama, Kiyoji, 3,998,988.

Hamers, Adolf: *See—*
Durholz, Friedrich; Heinen, Josef; and Hamers, Adolf, 3,998,893.

Hamilton, Stuart R. Orientation responsive alarm system. 3,999,178, Cl. 340-282.000.

Hammer, Franz: *See—*
Kolben, Felix D.; Hammer, Franz; and Tauber, George, 3,998,307.

Hammond, William Bushly: *See—*
Gee, Richard W.; and Hammond, William Bushly, 3,998,400.

Hanciulescu, Valentin Eugen; Milos, Dumitru; Serban, Costel; Lazar, Ion; and Fanica, Stefan, to Institutul de Cercetari si Proiectari Pentru Petrol si Gaze. Subsurface differential pressure recorder. 3,998,096, Cl. 73-151.000.

Handtmann, Albert: *See—*
Muller, Johann, 3,997,941.

Haney, Jerry D., to Simms, Romilly John. Reference quantity and unknown quantity comparator. 3,999,124, Cl. 324-99.00D.

Hanisch, Wolfgang: *See—*
Sivers, Rolf V.; Pilgrim, Reimer; Hanisch, Wolfgang; and Stotz, Erich, 3,998,290.

Hanscom, Genevieve I.: *See—*
Babb, Raymond E., 3,998,555.

Hansen, Donald J.; De Atley, William B.; Ripley, Robert L.; and Curtis, George F., to Union Carbide Corporation. Oxidation of molten ferrophosphorous. 3,998,631, Cl. 75-132.000.

Hansen, Karl A.; and Hendrickson, Iver Glen, to Boeing Company, The. Electromagnetic dent puller. 3,998,081, Cl. 72-56.000.

Harders, Holton G. Method and apparatus for removing construction piles. 3,998,063, Cl. 61-53.000.

Hardesty, Edwin Charles, to Western Electric Company, Inc. Device armed with a terminal for making electrical connection with a conductor. 3,998,514, Cl. 339-99.00R.

Harding, Jack F. Shoulder harness for carrying an archery bow. 3,998,367, Cl. 224-1.00A.

Harmsen, Gerhard, to Wavin B.V. Method and device for welding polyolefinic objects. 3,998,682, Cl. 156-158.000.

Harnish, Wayne Nelson; and Ramsey, Arthur Albert, to FMC Corporation. Substituted 2-arylquinazolines as fungicides. 3,998,951, Cl. 424-251.000.

Harpootlian, Harry: *See—*
Thomas, Richard C., Jr.; and Harpootlian, Harry, 3,998,827.

Harrell, John B., to Salem Corporation. Method of treating materials on a rotary hearth. 3,998,703, Cl. 201-32.000.

Harris, Arthur M., to Gomez, Edward G. Inhalation device for encapsulated concentrates. 3,998,226, Cl. 128-266.000.

Harris Corporation: *See—*
Hsiue, Paul Yung, 3,998,141.

Harris, James C., to Landis Tool Company. Cylindrical grinder. 3,998,010, Cl. 51-105.0SP.

Harris, Morton E.; and Kelley, Terrance E., to Mercier Corporation. Slag fluidizing agent and method of using same for iron and steel-making processes. 3,998,624, Cl. 75-30.000.

Harrison, Blair H.: *See—*
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Harrison, Ian T.: *See—*
Fried, John H.; and Harrison, Ian T., 3,998,966.

Hartmann, Rolf, to Rheinmetall G.m.b.H. Belt feeder for an automatic weapon. 3,998,125, Cl. 89-33.0CA.

Harwood, Leopold Albert: *See—*
Cochran, Larry Allen; and Harwood, Leopold Albert, 3,999,141.

Hasegawa, Hiroshi, to Nippon Kogaku K.K. Automatic control indication device in an automatic control type electronic flash unit. 3,999,193, Cl. 354-33.000.

Hashimoto, Takashi: *See—*
Araya, Kenzo; and Hashimoto, Takashi, 3,998,329.

Hasse, Adelbert, administrator: *See—*
Ploetz, Theodor, deceased; Haupt, Ursula; and Solich, Edeltraud, 3,998,730.

Hastings, Thomas N.: *See—*
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Hattori, Kenichi: *See—*
Iwami, Isamu; Kawasaki, Hironobu; and Hattori, Kenichi, 3,998,990.
Kitsuda, Toshiyuki; Hattori, Kenichi; Nakagawa, Hiromi; Wakao, Mitsuru; and Matsuda, Tsunehisa, 3,998,437.

Hauni-Werke Korber & Co., KG: *See—*
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Haupt, Ursula: *See—*
Franzen, Volker; Ploetz, Theodor; Haupt, Ursula; and Solich, Edeltraud, 3,998,731.
Ploetz, Theodor, deceased; Haupt, Ursula; and Solich, Edeltraud, 3,998,730.

Hauser, Jon W. Case and corner fastener therefor. 3,998,509, Cl. 312-263.000.

Hawkins, Albert W.; O'Hara, Matthew J.; Gortsema, Frank P.; and Hedaya, Eddie, to Union Carbide Corporation. Vapor deposition apparatus including fluid transfer means. 3,998,180, Cl. 118-5.000.

Hawley Manufacturing Corporation: *See—*
Overmyer, Robert C.; and Nijhawan, Pramodh, 3,999,001.

Hayes, John C., to Universal Oil Products Company. Hydrocarbon conversion with an acidic multimetallic catalytic composite. 3,998,724, Cl. 208-139.000.

Hayes, John C., to Universal Oil Products Company. Regeneration of a coke-deactivated, acidic bimetallic Pt-Ir catalyst. 3,998,755, Cl. 252-415.000.

Hayman-Chaffey, Charles R.; and Hayman-Chaffey, Frederick W. Display device. 3,997,991, Cl. 40-135.000.

Hayman-Chaffey, Frederick W.: *See—*
Hayman-Chaffey, Charles R.; and Hayman-Chaffey, Frederick W., 3,997,991.

Hayward, George J. Orthopedic canvas shoe. 3,997,984, Cl. 36-91.000.

Hearon, William Montgomery; Lo, Cheng Fan; and Witte, John F., to Boise Cascade Corporation. Selectively separating oxalic, tartaric, glyoxylic and erythronic acids from aqueous solutions containing the same. 3,998,878, Cl. 260-536.000.

Heckelman, James D., to Research Energy of Ohio, Inc. Blasting machine. 3,999,076, Cl. 307-41.000.

Heckler & Koch GmbH: *See—*
Kastner, Gunter; Ketterer, Dieter; Moller, Tilo; and Wossner, Ernst, 3,997,994.

Hedaya, Eddie: *See—*
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Hedwall, Phyllis Roberta: *See—*
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Hefty, Melvin R.: *See—*
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Heim Universal Corporation: *See—*
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Heimerich, Heinz: *See—*
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Heinen, Josef: *See—*
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Held, Franz; Glockner, Jorg; and Zimmer, Horst, to Maschinenfabrik Goebel, GmbH. Web cutting and rewind machine. 3,998,399, Cl. 242-65.000.

Helm, Herbert W., to F. L. Smithe Machine Company, Inc. Apparatus for removing cut panels from sheet material. 3,998,116, Cl. 83-98.000.

Hemingway, Maurice; and Ward, Trevor, to Hotwork International Limited. Gaseous fuel burners. 3,998,581, Cl. 431-158.000.

Henderson, Gary A.; and Dubuque, Douglas K., to American Home Products Corporation. Electrical shocking device. 3,998,459, Cl. 273-84.000.

Henderson, James Tillit, Jr.; and Newman, Robert Burton, to Union Carbide Corporation. Coke particle filter for pitch fumes to form electrodes. 3,998,933, Cl. 423-448.000.

Hendrickson, Iver Glen: *See—*
Hansen, Karl A.; and Hendrickson, Iver Glen, 3,998,081.

Hendry, Donald H.: *See—*
Costa, Peter F.; Finnemore, Frederick M.; Hendry, Donald H.; and Johnson, Bruce K., 3,999,201.

Hercules Incorporated: *See—*
Sutherland, Gordon, 3,998,756.

Hergert, Heinz, to Polrotor Inc. Method for conveying patterned pile fabrics. 3,997,946, Cl. 26-2.00R.

Hergert, Heinz, to Polrotor Inc. Method and apparatus for pile fabric finishing with a plurality of electrifier cylinders. 3,997,947, Cl. 26-2.00E.

Herion, Henry. Electrical receptacle device with main lamp and thermostatically-controlled auxiliary lamp sockets. 3,999,099, Cl. 315-93.000.

Hermann, Hans Dieter; Ebigt, Joachim; and Fabian, Klaus, to Hoechst Aktiengesellschaft. Polyvinyl butyral polymer mixture for making intermediate sheeting for laminated glass. 3,998,792, Cl. 260-73.00L.

Herndon, Gerald F.: *See—*
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Heron, John R.: *See—*
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Hertzberg, Abraham; and Christiansen, Walter, to Mathematical Sciences Northwest, Inc. Method for continuously carrying out a gas phase reaction and apparatus therefor. 3,998,711, Cl. 204-157.10S.

Hess, John I.; *See—*
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Hestermann, Klaus: *See—*
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Hewlett-Packard Company: *See—*
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Hubby, Laurence Meade, Jr.; and Boyden, James Harrison, 3,998,524.
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Hiab-Foco Aktiebolag: *See—*
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Hibbard, George A.: *See—*
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Hickey, Richard C., to Docutel Corporation. Paper web and ink ribbon feed control for character printer. 3,998,313, Cl. 197-133.00P.

Hickman, Gordon W., to Rockwell International Corporation. Multiplex driver system for liquid crystal display. 3,999,180, Cl. 340-336.000.

Hickmann, Eckhard; Fischer, Martin; Velic, Milan; and Volkert, Otto,

to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Monoketal of diketones as sensitizer for u.v. polymerizable systems. 3,998,712, Cl. 204-159.150.

Hicks, Elmer L.; Scheler, Robert L.; and Slayton, Douglas E., to United States of America, Navy. Saluting round adapter. 3,997,995, Cl. 42-77.000.

Hicks, Keith P.; and Steinberg, Jacob H. Modular pet burial casket. 3,997,948, Cl. 27-2.000.

Hidaka, Hidemasa: *See—*
Yomoto, Chobe; Adachi, Takashi; Nakajima, Yutaka; Hidaka, Hidemasa; Yoshida, Tsukasa; and Sugawara, Fumio, 3,998,696.

Higashi, Kiyoshi: *See—*
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Higgins, Jerry G.: *See—*
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Higuchi, Hikaru: *See—*
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Hinterkeuser, Jakob; and Abelitis, Andris, to Klockner-Humboldt-Deutz Aktiengesellschaft. Apparatus for thermal treatment of moist raw material. 3,998,583, Cl. 432-14.000.

Hirasaki, Takashi: *See—*
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Hirsch, Jean-Jacques, to Societe Generale de Constructions Electriques et Mecaniques (ALSTHOM). Non-linear digital-to-analog convertor. 3,999,181, Cl. 340-347.0DA.

Hitachi Chemical Company, Ltd.: *See—*
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Hitzel, Volker; Pfaff, Werner; Weyer, Rudi; and Weber, Helmut, to Hoechst Aktiengesellschaft. Benzenesulfonyl ureas and process for their manufacture. 3,998,968, Cl. 424-321.000.

Hobart Brothers Company: *See—*
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Hocking, Lothar Norman, to BBC Brown Boveri & Company Limited. Apparatus for producing metallic castings by progressively melting a solid charge. 3,998,264, Cl. 164-251.000.

Hodges, Carl N., to Resorts International, Inc. Method and apparatus for controlled-environment shrimp culture. 3,998,186, Cl. 119-2.000.

Hodges, Jack D., to Kaiser Cement & Gypsum Corporation. Wall panel mounting system. 3,998,018, Cl. 52-481.000.

Hodgson, Duncan Barry: *See—*
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Hodgson, Edward W. Orthodontic occlusion-improving appliance. 3,997,970, Cl. 32-14.00R.

Hodzic, Alija: *See—*
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Hoenig, James Robert; and Mallorca, Salvador Carigan, to Continental Can Company, Inc. Apparatus for perforating the necks of aerosol containers. 3,998,086, Cl. 72-325.000.

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Holbrook, LeGrand K.; and Topham, Silas Charles, to Medical Development Corporation. Regulator structure and system. 3,998,227, Cl. 128-276.000.

Holland, Esther Stebbins. Training vest or the like. 3,997,982, Cl. 35-56.000.

Hollander, Bruce Lee. Dispensing valve for bottled carbonated beverages. 3,998,364, Cl. 222-511.000.

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Hopkins, Jeffrey E. Attachment for rims of paint cans or the like. 3,998,352, Cl. 220-90.000.

Horn, Charles L.; and Persinger, Clifford B., to Westvaco Corporation. Elevator bucket shape restoration tool. 3,998,085, Cl. 72-316.000.

Horne, Thomas, to Coulter Electronics, Inc. Cuvette for automatic chemical testing apparatus. 3,998,594, Cl. 23-259.000.

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Hornung, Helmut O., to F. L. Smithe Machine Company, Inc. Method and apparatus for feeding items from a stack. 3,998,449, Cl. 271-112.000.

Horowitz, Carl; Dichter, Michael; and Mangaraj, Duryodhan. Metal plating of polymeric substrates. 3,998,602, Cl. 29-195.000.

Horrom, Bruce Wayne, to Abbott Laboratories. Novel N-vinyloxyethyl-α-methyl-β-phenethylamines for depressing appetite. 3,998,971, Cl. 424-330.000.

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Hosemann, John Henry, to Ideal Aerosmith, Inc. Electrical brush sensor apparatus useful for analog-to-digital converters. 3,999,022, Cl. 200-23.000.

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Hosono, Saburo, to Olympus Optical Co., Ltd. Bending tube for endoscope. 3,998,216, Cl. 128-6.000.

Hotwork International Limited: *See—*
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Hough, William D. Apparatus to control the water level in a swimming pool. 3,997,925, Cl. 4-172.170.

Houlihan, William J.; and Nadelson, Jeffrey, to Sandoz, Inc. Substituted-4'-aminoacetyl alkanoylphenones. 3,998,850, Cl. 260-340.900.

Hoult, David Ian, to National Research Development Corporation. Spectrographic analysis of materials. 3,999,118, Cl. 324-.50A.

Hounsfield, Godfrey Newbold; and Williams, Anthony Michael, to EMI Limited. Apparatus for examining a body by means of penetrating radiation. 3,999,073, Cl. 250-445.00T.

House, Ronnalee, to General Motors Corporation. Ignition distributor. 3,998,196, Cl. 123-146.50A.
Houston, Douglas E.: *See—*
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Houston, Thomas J. Auxiliary means for use with a kickstand. 3,998,470, Cl. 280-301.000.
Howard, Anthony, to Xerox Corporation. Sorting apparatus. 3,998,450, Cl. 271-173.000.
Howell, Alleyne C., Jr. Rail construction for rail-type electrification systems. 3,998,306, Cl. 191-23.00R.
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Hynd, Ike W. Pump-off control responsive to time changes between rod string load. 3,998,568, Cl. 417-12.000.
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Iwami, Isamu; Kawasaki, Hironobu; and Hattori, Kenichi, to Asahi-Dow Limited. Substrates adhered via ionomer resins. 3,998,990, Cl. 428-442.000.
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Jahn, Arnold. System for collecting and utilizing solar energy. 3,998,206, Cl. 126-271.000.
Jakobs, Willy: *See—*
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James, Arthur M.; and Conlee, Charles J. Tower crane climbing. 3,998,029, Cl. 52-747.000.
James, David Richard, to Mecanaids Limited. Invalid hoists. 3,998,284, Cl. 177-147.000.
James, Trevor N., to Ford Motor Company. Anti-rattle spring for a motor vehicle disc brake. 3,998,296, Cl. 188-73.500.
Janak, Jaroslav: *See—*
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Janowitz, Pedro Max; and Godwin, James William, to Tektronix, Inc. Time interval measurement method and apparatus. 3,999,128, Cl. 324-181.000.
Janssen, Paul Adriaan Jan; and Van Daele, Georges Henri Paul, to Janssen Pharmaceutica N.V. N-(4-piperidinyl)-N-phenylamides and -carbamates. 3,998,834, Cl. 260-293.680.
Janssen Pharmaceutica N.V.: *See—*
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Jansz, Joost W., to Hollandsche Beton Groep N.V. Subaqueous pile driving apparatus and method. 3,998,064, Cl. 61-53.500.
Japan Atomic Energy Research Institute: *See—*
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Japan Carlit Co., Ltd., The: *See—*
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Jarrell, Virgil N., to Chisholm-Ryder Company, Inc. Pod combine. 3,998,036, Cl. 56-13.500.
Jaunarajs, Janis V. Writing device employing writing tip mounted on flexible rotating shaft. 3,997,972, Cl. 33-18.00R.
Javan, Ali, to Massachusetts Institute of Technology. Gas detector. 3,998,557, Cl. 356-205.000.
Jenaer Glaswerk Schott & Gen.: *See—*
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Jenkins, Steven R.: *See—*
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Jensen, Peter Jarl. Air heater for fireplaces. 3,998,203, Cl. 126-122.000.
Jereb, Richard F., to Outboard Marine Corporation. Capacitor discharge ignition system with frequency operated speed limiting control. 3,998,198, Cl. 123-148.0CC.
Jewett, Harold A. Swimming pool with auxiliary fracturable floor for breaking fall of diver in unduly rapid descent. 3,997,924, Cl. 4-172.000.
Joa, Curt G. Method and apparatus for folding flaps of a sanitary pad. 3,998,447, Cl. 270-61.00R.
John Wyeth & Brother Limited: *See—*
Curran, Adrian Charles Ward, 3,998,831.
White, Alan Chapman; and Black, Robin Michael, 3,998,842.
Johnson, Brian Robert, to Amalgamated Wireless (Australasia) Limited. Doppler VOR beacons. 3,999,187, Cl. 343-844.000.
Johnson, Bruce K.: *See—*
Costa, Peter F.; Finnemore, Frederick M.; Hendry, Donald H.; and Johnson, Bruce K., 3,999,201.
Johnson, Calvin R. Tie rod with expandable locking cone. 3,998,424, Cl. 249-190.000.
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Johnson, Edward L.: *See—*
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Johnson, Everett A.: *See—*
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Johnson, Howard L., to Caterpillar Tractor Co. Three-pump - three-circuit fluid system of a work vehicle having controlled fluid-combining means. 3,998,053, Cl. 60-422.000.
Johnson, Phillip R.; Prillinger, Peter F. M.; and Sieving, Alfred W., to Caterpillar Tractor Co. Control system for an integral spring-loaded parking and service brake. 3,999,075, Cl. 303-63.000.
Johnston, Raymond H.: *See—*
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Jones, Arthur A. Force receiving exercising member. 3,998,454, Cl. 272-117.000.
Jones, David H.: *See—*
Bohanan, Charles S.; Jones, David H.; Raab, Harry F., Jr.; and Radkowsky, Alvin, 3,998,692.
Jones, Elwyn David; and Ridden, John Michael Charles, to Canadian Industries, Ltd. Bag closure clip. 3,997,943, Cl. 24-30.50P.
Jones, John Paul, to Air Products and Chemicals, Inc. High voltage AC

control driving low voltage device timed by coulometric cell. 3,999,088, Cl. 307-308.000.

Jones, Kenneth C.; and Wheaton, Robert M., to Dow Chemical Company, The. Recovery of non-ferrous metals from acidic liquors with a chelate exchange resin in presence of iron(III). 3,998,924, Cl. 423-7.000.

Jones & Laughlin Steel Corporation: *See—*
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Jones, Lloyd K.; and Yanov, David A., to Elk Manufacturing Company, Inc. Single control faucet. 3,998,241, Cl. 137-454.600.

Jones, Thaddeus M.; Johnson, Edward L.; and Kiwalle, Jozef, to Production Technology Inc. Length compensator for friction welding machines. 3,998,373, Cl. 228-2.000.

Joseph Lucas (Electrical) Limited: *See—*
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Joy Manufacturing Company: *See—*
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Juliano, Richard F., to Reliable Automatic Sprinkler Company, Inc., The. Apparatus for use with a fire safety device. 3,998,273, Cl. 169-37.000.

Junek, Jan: *See—*
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Kaas, Roger L., to General Motors Corporation. Transparent abrasion-resistant coating for a styrene acrylonitrile copolymer and method. 3,998,991, Cl. 428-447.000.

Kabasakalian, Peter; Kalliney, Sami Y.; Ganguly, Ashit K.; and Westcott, Anita, to Schering Corporation. Electrochemical process for preparing hydroxylaminoeverninomicins. 3,998,708, Cl. 204-59.00R.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
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Kabelwerke Brugg A.G.: *See—*
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Kablaoui, Mahmoud S., to Texaco Inc. Preparation of omega-carboxyalkanohydroxamic acids. 3,998,861, Cl. 260-404.000.

Kabushiki Kaisha Daini Seikosha: *See—*
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Kabushiki Kaisha Suwa Seikosha: *See—*
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Kadin, Saul B., to Pfizer Inc. 1,3(2H,4H)-Dioxoisoquinoline-4-carboxamides used as anti-inflammatory agents. 3,998,954, Cl. 424-258.000.

Kageyama, Bunji: *See—*
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Kajfez, Franjo; Blazevic, Nikola; and Sunjic, Vitomir, to CRC Compagnia di Recerca Chimica S.A. Optically active 1,4-benzodiazepines and process for the preparation thereof. 3,998,811, Cl. 260-239.30D.

Kali-Chemie Aktiengesellschaft: *See—*
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Kamiya, Yozi: *See—*
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Kamm, Lawrence J. Manufacturing machine. 3,998,316, Cl. 198-344.000.

Kan, Peter T.; Cenker, Moses; and Patton, John T., Jr., to BASF Wyandotte Corporation. Urethane modified carbodimide-isocyanurate foams from organic polyisocyanates and oxyalkylated mannich polyols. 3,998,766, Cl. 260-2.5AQ.

Kane, John L., to Owens-Corning Fiberglas Corporation. Coating material applicator. 3,998,183, Cl. 118-420.000.

Kanelous, Kanelos John. Carton having an openable and closeable pour opening. 3,998,380, Cl. 229-17.00R.

Kao Soap Co., Ltd.: *See—*
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Murata, Moriyasu; Yamanaka, Makoto; Sai, Fumio; and Fujino, Takashi, 3,998,762.

Karasa, Alvydas Petras: *See—*
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Kare, Morley R.: *See—*
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Karrer, Friedrich, to Ciba-Geigy Corporation. Epoxyalkoxy substituted benzophenones. 3,998,855, Cl. 260-348.00R.

Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Ether derivatives of phenylthiobenzenes. 3,998,890, Cl. 260-609.00F.

Karrer, Friedrich; and Farooq, Saleem, to Ciba-Geigy Corporation. Phenoxyphenylalkylthio-, alkenylthio-, alkinylthio- and benzylthio-alkoxy ethers. 3,998,891, Cl. 260-609.00F.

Karrer, Friedrich: *See—*
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Kaschak, Michael, to Westinghouse Electric Corporation. Angularly movable mirror assembly. 3,998,530, Cl. 350-310.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Printing device. 3,999,164, Cl. 340-172.500.

Kasson, James M., to Rolm Corporation. Method and apparatus for error reduction in digital information transmission systems. 3,999,129, Cl. 325-42.000.

Kastner, Gunter; Ketterer, Dieter; Moller, Tilo; and Wossner, Ernst, to Heckler & Koch GmbH. Shoulder arm with swivel breech member. 3,997,994, Cl. 42-9.000.

Katayama, Hajime; Miyamoto, Koichi; and Ohashi, Shoji, to Canon Kabushiki Kaisha. Developing liquid recovery device in a copying machine. 3,997,977, Cl. 34-73.000.

Katayama, Kiyoji: *See—*
Shimomai, Akiro; Fujimoto, Iwao; Hamana, Isao; and Katayama, Kiyoji, 3,998,988.

Katchka, Jay R.; and Braucksiek, Henry C., to Robertshaw Controls Company. Gaseous fuel burner system. 3,998,582, Cl. 431-349.000.

Kato, Masaaki; Sonobe, Hiroshi; Ishii, Hiromichi; Kobayashi, Masao; and Yamada, Kantaro, to Mitsubishi Rayon Co., Ltd. Catalytic process for preparation of unsaturated carboxylic acids. 3,998,876, Cl. 260-530.00N.

Kato, Shigeo: *See—*
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Katsumata, Mitsuo, to Kokusan Denki Co., Ltd. Signal source for use in a breakerless ignition system for an internal combustion engine. 3,998,197, Cl. 123-148.0CC.

Katz, Helmut, to Siemens Aktiengesellschaft. Liquid crystal display device. 3,998,526, Cl. 350-160.0LC.

Katz, Otto, to A. W. Faber-Castell. Mechanical pencil. 3,998,558, Cl. 401-94.000.

Kaupp, Norbett H., to Xerox Corporation. Apparatus for electrostatic paper stripping. 3,998,536, Cl. 355-3.00R.

Kaverina, Natalya Veniaminovna: *See—*
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Kazangey, Thomas, to United States of America, Air Force. Testing apparatus for incremental shaft encoder. 3,998,088, Cl. 73-1.00E.

Kazantsev, Lev Seliverstovich: *See—*
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Kazmark, Eugene Anthony, Sr. Portable luggage carrier with telescoping handle. 3,998,476, Cl. 280-655.000.

Keane, Thomas H.; and Schultz, Fred B., to Lear Siegler, Inc. Furniture assembly. 3,998,442, Cl. 267-105.000.

Kearney-National, Inc.: *See—*
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Keene, Kendall E.: *See—*
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Kellogg, Walter J.; Taylor, Glenn R.; and Gary, Wardell, to Westinghouse Electric Corporation. Indicator light circuit providing normal and emergency indication. 3,999,176, Cl. 340-253.00A.

Kelly, Patrick M.; and Russell, Stanley L., to Stromberg-Carlson Corporation. Noise rejection circuit. 3,999,085, Cl. 307-247.00A.

Kelsey-Hayes Company: *See—*
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Kendall Company, The: *See—*
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Kennametal Inc.: *See—*
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Kenyon, David L. Automobile lock removal tool. 3,997,960, Cl. 29-263.000.

Kerr, Richard A., Jr. Lead-pencil sharpener. 3,998,253, Cl. 144-28.100.

Keske, Frank Edward, to Caterpillar Tractor Co. Roller follower with anti-rotation retainer. 3,998,190, Cl. 123-90.500.

Ketterer, Dieter: *See—*
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Kibler, Roland G.: *See—*
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Kidd, Wayne L., to Xerox Corporation. Illumination system. 3,998,539, Cl. 355-4.000.

Kienert, Manfred: *See—*
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Kijima, Shizumasa; Yamatu, Isao; Hamamura, Kimio; Minami, Norio; Yamagishi, Youji; and Inai, Yuichi, to Eisai Co., Ltd. Process for synthesis of coenzymes Q. 3,998,858, Cl. 260-396.00R.

Kikuchi, Shintaro: *See—*
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Kiralfy, Alexander Enrico: *See—*
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Kirigaya, Kiichi; Ogiwara, Makoto; Koseki, Syosaku; and Yamaguchi, Toshiho, to Tomoegawa Paper Mfg. Co., Ltd. Electrostatic recording element. 3,998,987, Cl. 428-330.000.

Kirsch, Martin, Jr.: *See—*
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Kirtley, James L., Jr.; and Smith, Joseph L., Jr., to Massachusetts Institute of Technology. Superconducting machine having wound damper-shield winding. 3,999,091, Cl. 310-52.000.

Kirtley, James L., Jr., to Massachusetts Institute of Technology. Rotating electric machine having a controlled gradient winding and a circumferentially segmented magnetic core armature. 3,999,093, Cl. 310-198.000.

Kisanuki, Tohru: *See—*
Konishi, Masaichiro; Kisanuki, Tohru; Yamanishi, Akio; and Majima, Yutaka, 3,998,550.

Kisling, James W., III, to Schlumberger Technology Corporation. Wave motion compensating and drill string drive apparatus. 3,998,280, Cl. 175-5.000.

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Kita, Yuzo; and Watanabe, Kazuo, to Hitachi, Ltd. Interrupt information interface system. 3,999,165, Cl. 340-172.500.

Kitago, Teruaki; and Yoshida, Tadaaki, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Toyo Boseki Kabushiki Kaisha. Process for the production of carbon fiber paper. 3,998,689, Cl. 162-136.000.

Kitaj, Walter, to Owens-Illinois, Inc. Method of improving adhesion of vinyl polymers to glass. 3,998,985, Cl. 427-386.000.

Kitamura, Shigeyoshi: *See—*
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Kitsuda, Toshiyuki; Hattori, Kenichi; Nakagawa, Hiromi; Wakao, Mitsuru; and Matsuda, Tsunehisa, to Japanese National Railways; Kao Soap Co., Ltd.; and Kayabakogyo-Kabushiki-Kaisha. Equipment for charging ready-mixed concrete additives batchwise. 3,998,437, Cl. 259-154.000.

Kiwalle, Jozef: *See—*
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Kleitz, Kenneth S.; and White, Loren H., to United Technologies Corporation. Method and tool for removing turbine from gas turbine twin spool engine. 3,997,962, Cl. 29-427.000.

Klett, Gene R., to Caterpillar Tractor Co. One-piece replaceable cutting edge and tooth adapter with tooth. 3,997,988, Cl. 37-141.00R.

Kliphuis, Fritz Lammert, to Chemetron Corporation. Polyolefin composition and method for minimizing migration of U.V. absorber therein. 3,998,781, Cl. 260-42.450.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
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Kloren, Ulrich, to Ringfeder G.m.b.H. Detachable coupling device. 3,998,563, Cl. 403-370.000.

Klorikian, Vazgen Khorenovich: *See—*
Semenov, Alexandr Nikolaevich; Klorikian, Vazgen Khorenovich; Prostov, Nariman Alexandrovich; Khalyavkin, Mikhail Dmitrievich; Reznikov, Ilya Emmanuilovich; Gergokov, Izmail Makhmudovich; Gapanovich, Jury Matveevich; Evdokimenkov, Nikolai Pavlovich; and Fishman, Josif Davydovich, 3,998,066.

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Knapp, Ralph E., to Lear Siegler, Inc. Calibration of a meridian seeking instrument. 3,997,975, Cl. 33-324.000.

Knavish, Leonard A.: *See—*
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Knight, William E. Baby garment. 3,997,921, Cl. 2-75.000.

Ko, Wen Chuang; Schien, Albert; and Winnard, James Robert, to International Business Machines Corporation. Ion implantation apparatus utilizing multiple aperture source plate and single aperture accel-decel system. 3,999,097, Cl. 313-361.000.

Kobayashi, Gensuke; and Nakamura, Akio, to Shinetsu Polymer Co., Ltd. Multi-contact interconnectors. 3,998,513, Cl. 339-59.00M.

Kobayashi, Kazuhiko: *See—*
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Kobayashi, Kobee: *See—*
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Kobayashi, Masao: *See—*
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Koch, Robert B., to Bliss & Laughlin Ind., Inc. Knock-down pallet stacker. 3,998,169, Cl. 108-53.500.

Koebbeman, Richard J. Bottle cap crimper. 3,998,032, Cl. 53-352.000.

Koehring Company: *See—*
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Koff, Arnold: *See—*
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Kohl, Karl. Yarn guide units for Jacquard controlled warp knitting machines. 3,998,074, Cl. 66-214.000.

Kohler, Armin; von Falkai, Bela; and Offermann, Klaus, to Bayer Aktiengesellschaft. Process for production of polyester threads. 3,998,921, Cl. 264-210.00F.

Kohlert, Gerhard: *See—*
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Koizumi, Yutaka, to Ricoh Co., Ltd. Guide rod apparatus. 3,998,497, Cl. 308-3.00R.

Kokusan Denki Co., Ltd.: *See—*
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Kolben, Felix D.; Hammer, Franz; and Tauber, George. Parking meter. 3,998,307, Cl. 194-4.00R.

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Konishi, Masaichiro; Kisanuki, Tohru; Yamanishi, Akio; and Majima, Yutaka, to Minolta Camera Corporation. Photoelectric oximeter. 3,998,550, Cl. 356-39.000.

Konz, Wilhelm; and Reichl, Richard, to Boehringer Ingelheim GmbH. 1,3,7-Trisubstitued xanthine peripheral vasodilators. 3,998,953, Cl. 424-253.000.

Koo, Bonny B. Dental floss manipulator. 3,998,236, Cl. 132-92.00R.

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Koppe, Herbert: *See—*
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Kovach, Stephen M.; and Wilson, George D., to Ashland Oil, Inc. Selective hydrogenation of cyclopentadiene-norbornadiene mixtures. 3,998,897, Cl. 260-666.00A.

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Kovaleski, Joseph J. Supporting fixtures for wire-carrying spools. 3,998,403, Cl. 242-129.720.

Kovar, Stanislav, to Zbrojovka Vsetin, narodni podnik. Device for compensating the length of binding threads in a rotary shedding device. 3,998,247, Cl. 139-54.000.

Kozuki, Susumu: *See—*
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Kramer, Melvin G., to Brunton Company, The. Angular displacement measuring apparatus with strobe means. 3,999,064, Cl. 250-231.0SE.

Kratomi, Shunsei. Electrical switch device. 3,999,106, Cl. 317-151.000.

Kreick, John R.; and Anderson, Glenn A., to Sanders Associates, Inc. Method for making small gas-filled beads. 3,998,618, Cl. 65-105.000.

Kressin, John A.; Bergman, Charles T.; and Buchholz, Arnold R., to Brandt, Inc. Coin sorter. 3,998,237, Cl. 133-3.00A.

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Kronenberger, Paul E.; and Braden, Ralph S., to General Motors Corporation. Refrigerator receptacle support and adjustable air deflector-drip tray. 3,998,069, Cl. 62-288.000.

Kruglov, Igor Ivanovich: *See—*
Babenko, Vladimir Alexandrovich; Boeva, Galina Georgievna; Violin, Eduard Efimovich; Vodakov, Jury Alexandrovich; Ivanova, Eleonora Grigorievna; Kmita, Tatyana Georgievna; Pavlichenko, Vadim Ivanovich; Ryzhikov, Igor Veniaminovich; Kholuyanov, Georgy Fedorovich; Kruglov, Igor Ivanovich; Lomakina, Galina Alexandrovna; and Novikov, Vladimir Pavlovich, 3,999,206.

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Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, to Ciba-Geigy Corporation. Antihypertensive compositions. 3,998,955, Cl. 424-266.000.

Kuhr, Albert F.; Lau, Edward R.; and Bartels, Harold, to United States Gypsum Company. Adjustable suspension systems for ceilings. 3,998,020, Cl. 52-484.000.

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Kulka, Thomas S. Reel band and method of using same. 3,998,325, Cl. 206-400.000.

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Kusay, Roland Gregor Paul, to BOC Limited. Vacuum drying and degassing. 3,998,738, Cl. 210-180.000.

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Lahiri, Syamal K., to International Business Machines Corporation. Josephson junction device having intermetallic in electrodes. 3,999,203, Cl. 357-5.000.

Lallave, Victorina, to Raymond Lee Organization, Inc., The, a part interest. Removable auxiliary seat. 3,998,490, Cl. 297-243.000.

Lambertson, Theodore C. Pot rack. 3,998,332, Cl. 211-13.000.

Lambly, Charles A. R.; Leibson, Irving; and Chassagne, Pierre J., to Bechtel International Corporation. Method for selectively extracting magnesium chloride hexahydrate from magnesium chloride hexahydrate bearing materials in situ by solution mining. 3,998,492, Cl. 299-4.000.

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Landess, Lynn H., executrix: *See—*
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Lang, Milton R., Jr.: *See—*
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Langbein, Adolf: *See—*
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Lange, Kenneth Wilson, to Chicago Bridge & Iron Company. Sea floor supported structures with crushable support. 3,998,062, Cl. 61-50.000.

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Lapierre, Gilles; and Dubois, Jacques, to Miron Company Ltd. Portable hopper apparatus for supplying a dry mortar mix. 3,998,362, Cl. 222-185.000.

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Larson, Marlow W. Archery bow sighting mechanism. 3,997,974, Cl. 33-265.000.

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Lau, Philip T. S.; Orvis, Roy L.; and Gompf, Thomas E., to Eastman Kodak Company. Silver halide emulsions with incorporated 4,6-difluorophenolic couplers. 3,998,642, Cl. 96-100.000.

Lawrence, Norman F.; and Reesman, Stanley H., to General Foods Corporation. Corrugated cereal flakes. 3,998,978, Cl. 426-285.000.

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Lee, Siu Kee; and Cuda, John, to Sperry Rand Corporation. Automatic gain control for transducer circuit. 3,999,133, Cl. 328-2.000.

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Leith, William Cumming, to Cominco Ltd. Rotating concentric homogeneous turbulence centrifuge. 3,998,610, Cl. 55-17.000.

Lemelshtrich, Moshe. Flow restrictor and trickle emitter. 3,998,391, Cl. 239-542.000.

Leonardo, Ignazio; and Faruolo, Michael, to General Cable Corporation. Adaptor for powder actuated tool or similar item. 3,998,372, Cl. 227-9.000.

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Le Roy, Guy, to Societe Lannionnaise d'Electronique Sle-Citerel; and Compagnie Industrielle des Telecommunications Cit-Alcatel. Time-division multiplex switching circuitry. 3,999,162, Cl. 340-172.500.

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Lewis, Eugene R. Insulated siding panel assembly. 3,998,021, Cl. 52-531.000.

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Liautaud, James P. Injection-molded faucet assembly. 3,998,240, Cl. 137-375.000.

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Liddle, Raymond, to General Electric Company. Composition and methods for protecting and rendering non-porous surfaces water and soil repellent. 3,998,643, Cl. 106-2.000.

Lieberman, Sheldon I., to GTE Laboratories Incorporated. Method of preparing dry thionyl chloride electrolyte. 3,998,660, Cl. 429-196.000.

Liepa, Alexander L., to Procter & Gambie Company, The. Potato chip products and process for making same. 3,998,975, Cl. 426-550.000.

Liepmann, Hans-Gunther: *See—*
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Little, Robert T. Camera adjustable exposure control adapter. 3,999,195, Cl. 354-60.00L.

Livemore, Gerald Sydney Victor, to Foster Wheeler Energy Corporation. Production of hot clean industrially usable gas. 3,998,608, Cl. 48-197.00R.

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Lubrizol Corporation, The: *See—*
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Luger, Paul P., to Pioneer Educational Society, The. Optical measuring system with digital electrometer scaler. 3,999,063, Cl. 250-231.00R.

Luhrs, Millen E.: *See—*
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Lutchemeier, Fritz, to Terrain King Corporation. Trailer hitch assembly. 3,998,471, Cl. 280-492.000.

Luth, Claus-Peter, to Macchine Tessili Circolari-Matec S.p.A. Selection device for oscillating jacks in a circular knitting machine. 3,998,073, Cl. 66-50.00R.

Lybarger, James H., to Shell Oil Company. Plugging a subterranean reservoir with a self-sealing filter cake. 3,998,269, Cl. 166-250.000.

Lyman, Richard Ricker; and Eskedal, Ole, to Hewlett-Packard Company. Multiple access interconnect system. 3,999,170, Cl. 340-173.00R.

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M & W Gear Company: *See—*
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Maahs, Gunter: *See—*
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Mabuchi, Kenichi, to Mabuchi Motor Co. Ltd. Adapter. 3,998,516, Cl. 339-153.000.

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Maccabee, Bruce Sargent. Simple systems for light beam modulation by acoustic surface waves. 3,998,092, Cl. 73-71.300.

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MacMillan, Douglas M. Plow and earth fragmentation machine. 3,998,276, Cl. 172-67.000.

Macvaugh, Gilbert S. Snoring deconditioning system and method. 3,998,209, Cl. 128-1.00R.

Madaus, Rolf; and Brusewitz, Gerhard, to Dr. Madaus & Co. α-Amino-β-(N-benzylthiocarbamoylthio) propionic acid and therapeutic compositions. 3,998,964, Cl. 424-300.000.

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Mahl, Gunard O. B., to CHA Industries. Creep resistant sealing arrangement for bell jar. 3,998,347, Cl. 215-1.00R.

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Mainka, Helmut; Schmidt, Hans; and Grosshennig, Gunther, to Salzgitter Maschinen Aktiengesellschaft. Press for sugar beet and similar chips. 3,998,148, Cl. 100-117.000.

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Malhotra, Satish Chandra, to Du Pont de Nemours, E. I., and Company. Process for reducing discoloration and dark spotting in tetrafluoroethylene resin molded parts. 3,998,770, Cl. 260-17.4SG.

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Maly, George P., to Union Oil Company of California. Method of acidizing wells. 3,998,272, Cl. 166-281.000.

Maly, George P.; Landess, John A., deceased (by Landess, Lynn H., executrix); and Foral, Thomas, to Union Oil Company of California. Method and solvent composition for stimulating the production of oil from a producing well. 3,998,743, Cl. 252-8.55B.

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Manchester, Kenneth L.: *See—*
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Mandas, Peter J.; and Telnaes, Inge S., to Bally Manufacturing Corporation. Coin accepting device. 3,998,309, Cl. 194-97.00R.

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Manguso, Michael F. Carpet tack strip anchoring means and installation tool. 3,997,937, Cl. 16-6.000.

Manner, James A., to PPG Industries, Inc. Synthesis of sulfonyl peroxides. 3,998,888, Cl. 260-607.00R.

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Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Thread cutter device for sewing machines. 3,998,172, Cl. 112-252.000.

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Marotta Scientific Controls, Inc.: *See—*
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Marquardt, Ewald, to J. & J. Marquardt. Electrical switch construction. 3,999,024, Cl. 200-68.000.

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Martin, Carlyle J. Seal assemblies for water well casings. 3,998,245, Cl. 138-89.000.

Martin, Melvin S. Plant supporting and watering apparatus. 3,998,007, Cl. 47-39.000.

Martin, Robert C.: *See—*
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Martin, Ronald L.; and Meyer, Donald E., to Honeywell Inc. Pneumatic thermostat aspirator. 3,998,384, Cl. 236-87.000.

Martin, Thomas C. Brake structure and adjusting device therefor. 3,998,295, Cl. 188-71.700.

Martin, Wilbert A., to Honeywell Inc. Lamp support. 3,998,519, Cl. 339-258.00R.

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Marzouk, Marzouk Y. Method of making protective optical components. 3,998,531, Cl. 351-166.000.

Masar, Edward J.; Boucher, John B.; and Williams, Ralph A., to Inmont Corporation. Method of applying coatings. 3,998,716, Cl. 204-181.000.

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Mascola, Donald C. Telephone random number game. 3,998,465, Cl. 273-139.000.
Mason, David M.; and VanDrunen, Cornelius J., to Institute of Gas Technology. Production of beta-lithium aluminate ($LiAlO_2$). 3,998,939, Cl. 423-600.000.
Massac, Gilbert Jean-Louis, to Gazocean. Semi-membrane like container, heat-insulated fluid-tight tank embodying same and methods of making same. 3,998,350, Cl. 220-1.00B.
Massachusetts Institute of Technology: *See*—
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Mather, Byron L.; and Johnston, Raymond H., to Plastronics, Inc. Breather assembly for a sealed container. 3,998,255, Cl. 150-1.000.
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Matsuzaki, Atsushi: *See*—
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Mattel, Inc.: *See*—
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Mauleon, Diosdado M.; and Peper, Henry, Jr., to Gillette Company, The. Method of cutting and grinding porous pen tips. 3,998,982, Cl. 427-230.000.
Maurer, Herman Joseph, to J. I. Case Company. Brake system for an articulated vehicle. 3,998,289, Cl. 180-6.640.
Maxwell, John P.; and Ury, John M., to Wagner Electric Corporation. Locking dashboard control valve. 3,998,495, Cl. 303-89.000.
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Mayer, Gerald M.: *See*—
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Mayer, Rolf, to Institut fur Kerntechnik und Energiewandlug e.V. Current control in an electron beam welder. 3,999,032, Cl. 219-121.0EB.
Mayhew, John T., to National Steel Corporation. Continuous metallic strip hot-dip metal coating apparatus. 3,998,182, Cl. 118-8.000.
Mayra, Matti V. V. Skid preventer for vehicle tires. 3,998,257, Cl. 152-210.000.
McAlarney, Fred R., to Pantasote Company, The. Extruder screw. 3,998,318, Cl. 198-657.000.
McArthur, Dennis P., to Union Oil Company of California. Iridium-nickel exhaust gas conversion catalyst and process. 3,998,930, Cl. 423-213.500.
McBride, D. R. Beltwiper blade. 3,998,322, Cl. 198-497.000.
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Umphrey, Ronald W.; and McCain, David L., 3,998,396.
McCaughey, William Stephen, to Bunker Ramo Corporation. Apparatus for terminating a plurality of insulated conductors in respective insulation-piercing contacts of an electrical connector. 3,997,955, Cl. 29-203.0HT.
McCloskey, Albert R., to Heim Universal Corporation. Keyed bearing with inserts. 3,998,504, Cl. 308-72.000.
McCoy, Daniel J., to General Electric Company. Overcurrent detection apparatus for controlling power supplies. 3,999,113, Cl. 321-12.000.
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McKinley, Roe L.; McKinley, Jack M.; and Kirsch, Martin, Jr., to G & K Development Co., Inc. Steam generating apparatus. 3,998,049, Cl. 60-39.550.
McLaughlin, Neil B.; and Allan, John R., to Canadian Patents and Development Limited. Radiant energy integrating meter. 3,999,061, Cl. 250-214.00R.
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Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, 3,998,958.
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Merz, Herbert; Langbein, Adolf; Stockhaus, Klaus; and Wick, Helmut, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 2-(heteroaryl-methyl)-5,9β-dialkyl-6,7-benzomorphan and method of use. 3,998,960, Cl. 424-275.000.
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Mihailovski, Alexander; and Simone, Raymond A., to Stauffer Chemical Company. Production of N,N-diethyl 2(α-naphthoxy)propionamide. 3,998,880, Cl. 260-559.00B.

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Milkowski, Wolfgang; Budden, Renke; Funke, Siegfried; Huschens, Rolf; Liepmann, Hans-Gunther; Stuhmer, Werner; and Zeugner, Horst, to Kali-Chemie Aktiengesellschaft. Benzodiazepine derivatives. 3,998,809, Cl. 260-239.0BD.

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Miyoshi, Tadahiko; Kurihara, Yasutoshi; and Ura, Mitsuru, to Hitachi, Ltd. Method of producing infrared luminescent diodes. 3,998,672, Cl. 148-171.000.

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Roberts, Michael G.; and Bolen, Charles E., 3,998,909.

Owens-Illinois, Inc.: *See—*
Eggert, Noel B., 3,998,320.
Florence, Jack M.; and Smith, William E., 3,998,668.
Kitaj, Walter, 3,998,985.
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Watson, Barry; and Breno, Philip J., 3,998,717.

P. R. Mallory & Co., Inc.: *See—*
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Packard Instrument Company, Inc.: *See—*
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Pallos, Ferenc M., to Stauffer Chemical Company. Triazine—antidote compositions and methods of use for cotton. 3,998,621, Cl. 71-93.000.

Pallos, Ferenc M.: *See—*
DeBaun, Jack R.; Pallos, Ferenc M.; and Teach, Eugene G., 3,998,970.

Palmcrantz, Jan Birger, to Hiab-Foco Aktiebolag. Bridge for loading cranes. 3,998,414, Cl. 248-2.000.

Palmer, Jim B.: *See—*
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Panek, George J., to International Telephone and Telegraph Corporation. Hermetic electrical penetrator. 3,998,515, Cl. 339-117.00P.

Pangborn, Jon B.; Sharer, John C.; and Elkins, Robert H., to American Gas Association, Inc. Process for producing hydrogen and oxygen from water. 3,998,942, Cl. 423-658.000.

Pantasote Company, The: *See—*
McAlarney, Fred R., 3,998,318.

Paquette, Michael W.; Hess, John I.; and Haber, William J. Test apparatus for determining quality of packaging for vacuum packaged products. 3,998,091, Cl. 73-52.000.

Paramythioti, Michel, to Albaret S.A. Hydrostatic transmission vehicles. 3,998,287, Cl. 180-25.00R.

Pardee, Robert P.; Bickling, Archie L., Jr.; and Loran, Thomas J., to Ball Brothers Research Corporation. Method and composition for lubricating and lubricated substrates. 3,998,989, Cl. 428-409.000.

Park, Robert H., to Fast Load Control Inc. Method of effecting fast turbine valving for improvement of power system stability. 3,998,058, Cl. 60-652.000.

Parker, Alfred B.: *See—*
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Parsons, Gary L.: *See—*
Bost, Curtis C.; Irwin, Eugene Scott; Keineth, Thomas M.; Russell, Robert Q.; Ince, Harsch C., Jr.; Parsons, Gary L.; and Turner, James Keith, 3,998,740.

Parsons, Robert, to Texas Instruments Incorporated. Analog signal storage using recirculating CCD shift register with loss compensation. 3,999,171, Cl. 340-173.0RC.

Parthemore, Keith Gordon, to Du Pont de Nemours, E. I., and Company. Flow control system for the precipitation of silver halide emulsions. 3,999,048, Cl. 235-151.120.

Paskalakis, Lucas G.: *See—*
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Pass, Herman W.; Burton, John S.; Whitney, Ronald L.; and Langford, Forest L., to Terminal Data Corporation. Synchronous auxiliary camera projector. 3,998,544, Cl. 355-40.000.

Patsch, Manfred: *See—*
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Patton, John T., Jr.: *See—*
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Paules, Eugene H.: *See—*
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Paurat, Friedrich Wilhelm. Combined milling and impact apparatus for tunneling. 3,998,493, Cl. 299-56.000.

Pavlichenko, Vadim Ivanovich: *See—*
Babenko, Vladimir Alexandrovich; Boeva, Galina Georgievna; Violin, Eduard Efimovich; Vodakov, Jury Alexandrovich; Ivanova, Eleonora Grigorievna; Kmita, Tatyana Georgievna; Pavlichenko, Vadim Ivanovich; Ryzhikov, Igor Veniaminovich; Kholuyanov, Georgy Fedorovich; Kruglov, Igor Ivanovich; Lomakina, Galina Alexandrovna; and Novikov, Vladimir Pavlovich, 3,999,206.

Payne, Joe E. Speedometer cable housing release and removal tool. 3,997,958, Cl. 29-239.000.

Payne, Nicholas Stockford; and Bailey, Ronald Lynn, to Procter & Gamble Company, The. Liquid detergent composition. 3,998,750, Cl. 252-108.000.

Pearce, Jai Kumar: *See—*
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Pearce, Ralph Reginald, to EMI Limited. Magnetic ink printing method. 3,998,160, Cl. 101-426.000.

Pearce, Warren, Jr.; and Ramsey, Charles W., to General Motors Corporation. Lamp socket and bulb assembly with side contacts. 3,999,095, Cl. 313-318.000.

Pearson, Dale S.: *See—*
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Pedersen, Charles John, to Du Pont de Nemours, E. I., and Company. Complexes of macrocyclic polyether with mercaptoimidazolines. 3,998,838, Cl. 260-309.600.

Peil, William; and McFadyen, Robert J., to General Electric Company. Detector for AM-FM signals. 3,999,138, Cl. 329-2.000.

Pellen, Josef, to Sperry Rand Corporation. Bale wagons. 3,998,344, Cl. 214-520.000.

Pelletier, John; and Soucy, Eugene H. Furring and fireproofing protection clip assembly. 3,998,028, Cl. 52-727.000.

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Pennwalt Corporation: *See—*
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Pennzoil Company: *See—*
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Peper, Henry, Jr.: *See—*
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Pepsico, Inc.: *See—*
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Pernod, Roger; and Rufer, Willy, to Battelle Memorial Institute. Low-calorie confection. 3,998,976, Cl. 426-103.000.

Perschy, James A., to United States of America, Navy. Real time control for digital computer utilizing real time clock resident in the central processor. 3,999,169, Cl. 340-172.500.

Persinger, Clifford B.: *See—*
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Peterli, Hans Jakob: *See—*
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Peters, Charles L., Jr., to Box Innards, Inc. High speed partition assembling method and apparatus. 3,998,136, Cl. 93-37.00R.

Peters, Donald G.: *See—*
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Peters, Josef; and Gebhardt, Gunter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for controlling the seizure of a cover for the charge opening of a coking furnace. 3,998,705, Cl. 202-251.000.

Petersen, Harry, Jr. Ice fishing hook retriever. 3,997,998, Cl. 43-53.500.

Peterson, Donald John; and Robbins, Medford Dwight, to Procter & Gamble Company, The. Process for producing cyclopropyl substituted organosulfides. 3,998,889, Cl. 260-609.00E.

Peterson, Samuel F.; and Rundzaitis, Alfons, to Associated Mills, Inc. Selectable multiple-nozzle showerhead. 3,998,390, Cl. 239-394.000.

Petkovich, Tony. Tool chuck for a drill press. 3,998,467, Cl. 279-37.000.

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Petschauer, Richard J., to Sperry Rand Corporation. Error logging in semiconductor storage units. 3,999,051, Cl. 235-153.0AK.
Pettit, Ernest M., to McDonnell Douglas Corporation. Transpiration cooling system having an expulsion bladder. 3,998,359, Cl. 222-3.000.
Pettit, Paul H., Jr., to Du Pont de Nemours, E. I., and Company. Thermosetting powder coating composition of a blend of acrylic polymers having different glass transition temperatures and a blocked polyisocyanate cross-linking agent. 3,998,768, Cl. 260-17.00R.
Petty, James S., to United States of America, Air Force. Supersonic diffuser. 3,998,393, Cl. 239-553.500.
Pfaff, Werner: *See—*
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Pfarrwaller, Erwin, to Sulzer Brothers Limited. Cut-off device for a textile machine. 3,998,249, Cl. 139-291.00C.
Pfiffer, Heinrich, to Maschinenfabrik J. Dieffenbacher & Co. Press spar for heated panel press. 3,998,580, Cl. 425-407.000.
Pfizer Inc.: *See—*
Kadin, Saul B., 3,998,954.
Nakanishi, Susumu; and Barth, Wayne E., 3,998,883.
Wiedermann, Hans E., 3,998,828.
Phillips, Carl Ferman. Drapery hook for maintaining a drapery heading in upright position. 3,997,944, Cl. 24-86.00C.
Phillips, Darwin E., to SCI Systems, Inc. Rotor structure for rotary electrical printer. 3,998,315, Cl. 197-1.00R.
Phillips, George C., Jr.: *See—*
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Phillips, Gordon Hanley; Lawrence, Robin; Stephenson, Leslie; and Ayres, Barry Edward, to Glaxo Laboratories Limited. Steroid anaesthetics of the pregnane and 19-norpregnane series. 3,998,829, Cl. 260-239.500.
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Stapp, Paul R., 3,998,848.
Uraneck, Carl A.; Burleigh, John E.; and Cobb, Raymond L., 3,998,998.
Vanderveen, John W., 3,998,934.
Walton, Roger J., 3,998,767.
Philofsky, Harold M.; and Kolek, Robert L., to Westinghouse Electric Corporation. Electrical apparatus having conductors banded together with flexible belts. 3,999,157, Cl. 336-197.000.
Pierrat, Michel A., to Compudrive Corporation. Mechanical drives. 3,998,112, Cl. 74-805.000.
Pierre Fabre S.A.: *See—*
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Pifferi, Giorgio: *See—*
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Pike, Cecil A.: *See—*
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Pilgrim, Reimer: *See—*
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Pinaire, Lon W.; Godwin, Robert H.; and Freeman, John M., to Bliss & Laughlin Ind., Inc. Dual wheel caster assembly. 3,997,938, Cl. 16-45.000.
Pioneer Educational Society, The: *See—*
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Luger, Paul P., 3,999,063.
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Pistiner, Josef Siegfried, to RCA Corporation. Minimization of spacecraft attitude error due to wheel speed reversal. 3,998,409, Cl. 244-165.000.
Pitney-Bowes, Inc.: *See—*
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Pitroda, Satyan G. Electronic diary. 3,999,050, Cl. 235-152.000.
Pittman, Allen G.; and Wasley, William L., to United States of America, Agriculture. Method for controlled release of fluoroketones. 3,998,620, Cl. 71-85.000.
Pizatella, Robert F.; and Johnson, E. A. Exercise process and apparatus. 3,998,100, Cl. 73-379.000.
Plampin, James Nelson: *See—*
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Plauson, Richard A., deceased; by Plauson, Mary E., legal representative; and McBride, William, to United States of America, Navy. Method for bomb manufacture. 3,998,676, Cl. 149-7.000.
Pless, John H. Multi-hull vessels. 3,998,175, Cl. 114-39.000.
Plessey Handel und Investments A.G.: *See—*
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Ploetz, Theodor, deceased (by Hasse, Adelbert, administrator); Haupt, Ursula; and Solich, Edeltraud, to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung. Method of purifying waste water. 3,998,730, Cl. 210-28.000.
Plough, Inc.: *See—*
Kingsford, Ted I., 3,998,235.
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Poidomani, Vincent. External catheterize device for males. 3,998,228, Cl. 128-295.000.
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Polgar, Michael Stephen, Jr.; and Majkrzak, Charles Peter, to International Telephone and Telegraph Corporation. Plural antennas on common support with feed line isolation. 3,999,185, Cl. 343-709.000.
Polgar, Michael Stephen, Jr.: *See—*
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Pommerening, Uwe A.; and Richards, Glenn L., to Stromberg-Carlson Corporation. Timer associated with CB relay. 3,999,018, Cl. 179-18.0FA.
Pommerening, Uwe A.; and Richards, Glenn L., to Stromberg-Carlson Corporation. Private automatic branch exchange providing line appearance connection of operator complex to single stage matrix. 3,999,019, Cl. 179-27.0FF.
Pomper, Michael: *See—*
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Poppinger, Herbert; and Schick, Ludwig, to Siemens Aktiengesellschaft. Control unit for a converter. 3,999,114, Cl. 321-47.000.
Porret, Daniel: *See—*
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Porter, John P. Data acquisition system. 3,999,046, Cl. 235-151.100.
Porter, Raymond P.; Manchester, Kenneth L.; and Shih, Peter T. K., to Acushnet Company. Windshield wiper blade treatment. 3,997,935, Cl. 15-250.360.
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Portmann, August Thomas, to Bruderer AG. Apparatus for guiding a ram within the machine frame of a punch press or the like. 3,998,498, Cl. 308-3.00A.
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Possis, Zinon C., to St. Jude Medical, Inc. Heart valve prosthesis and suturing assembly and method of implanting a heart valve prosthesis in a heart. 3,997,923, Cl. 3-1.500.
Post, William C.: *See—*
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Potlatch Corporation: *See—*
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Poturalski, Daniel H. Three player chess game board. 3,998,464, Cl. 273-131.0KN.
Poulallion, Paul Louis: *See—*
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Prame, Eric Sune, to International Business Machines Corporation. Display panel for running characters with optical phase shift. 3,999,179, Cl. 340-334.000.
Precision Flexmold, Inc.: *See—*
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Presser, Adolph; and Mykietyn, Edward, to United States of America, Army. Variable tuning and feedback on high power microwave transistor carrier amplifier. 3,999,142, Cl. 330-31.000.

Presto Lock Company, Division of Walter Kidde & Company, Inc.: *See—*
Bako, Lazlo, 3,998,077.
Preus, Paul. Barrier for water carried pollutants. 3,998,060, Cl. 61-1.00F.
Price, George M., to Frymaster Corporation, The. Frying apparatus with compensated thermostat. 3,998,146, Cl. 99-403.000.
Price, Robert A., to Bio-Volt Corporation. Self-adjustable holder for automatically positioning electroencephalographic electrodes. 3,998,213, Cl. 128-2.10B.
Priest, Ernest Horace; and Priest, Gordon Michael, to Beverley Chemical Engineering Company, Ltd. Heater for heating a fluid. 3,998,188, Cl. 122-250.00R.
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Prince, Ralph P.; Belanger, Paul E.; and Westervelt, Rudy G., to Council of Livestock Protection, Inc. Double-rail animal securing assembly. 3,997,940, Cl. 17-1.00A.
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Payne, Nicholas Stockford; and Bailey, Ronald Lynn, 3,998,750.
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Pusch, Gunter; and Duhrkopp, Jens. Method for measuring the temperature of axle bearings of vehicles. 3,998,549, Cl. 356-48.000.
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Putter, Henning; and Breitinger, Reinhard, to Volkswagenwerk Aktiengesellschaft. Bumper arrangement for a vehicle equipped with longitudinal members. 3,998,485, Cl. 293-70.000.
Putzer, Raymond M., to Precision Flexmold, Inc. Flexible mold having internal seams. 3,998,422, Cl. 249-117.000.
Puyplat, Olivier, to Cibie Projecteurs. Motor vehicle headlamp system. 3,999,058, Cl. 240-62.00R.
Pyle, William I., to Ford Motor Company. Thermoelectric heat pump for chemiluminescence detectors. 3,998,592, Cl. 23-254.00E.
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Rabeler, Hans H. Process for producing fruit flakes or wafers, and fruit flakes or wafers produced in accordance therewith. 3,998,977, Cl. 426-144.000.
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Radovsky, Jonathan Samuel, to RCA Corporation. Bias current circuit. 3,999,140, Cl. 330-22.000.
Rae, James T. Range limiter for a thermostat. 3,999,158, Cl. 337-360.000.
Raia, Alfred, to Lawrence Peska Associates, Inc., a part interest. Ladder extension and leveler. 3,998,293, Cl. 182-204.000.
Rairden, John R., III, to General Electric Company. Protective coatings for superalloys. 3,998,603, Cl. 29-197.000.
Rakoczy, Paul J. Impact panel separator locking device. 3,998,168, Cl. 105-490.000.
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Ramstrom, Lee Webber; Karasa, Alvydas Petras; and Markle, Stanley Alan, to Black and Decker Manufacturing Company, The. Battery pack and latch. 3,999,110, Cl. 320-2.000.
Randell, John Edward, to National Research Development Corporation. Power systems. 3,998,059, Cl. 60-659.000.
Ransome Hoffmann Pollard Limited: *See—*
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Rasigade, Herve Pierre, to Societe Anonyme: Poclain. Jacks. 3,998,132, Cl. 91-395.000.
Rasmussen, Chris Royce; Gardocki, Joseph Francis; and Plampin, James Nelson, to McNeil Laboratories, Incorporated. Pyrrolidylidene, piperidylidene and hexahydroazepinylidene ureas as CNS depressants. 3,998,958, Cl. 424-274.000.
Rasquin, Werner, to Felten & Guilleaume Kabelwerke AG. Terminal connector for high-energy electric cables with internal cooling. 3,999,002, Cl. 174-15.0BH.
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Real, Kenneth G.; Ellefson, Larry P.; and Brooks, Robert J., to Interface Mechanisms, Inc. Hammer assembly for use in impact printers. 3,998,154, Cl. 101-93.480.
Rechtsteiner, Steve A.; Nelson, Philip E.; and Heron, John R. Method of aseptically sealing a storage tank. 3,998,589, Cl. 21-58.000.
Reckitt & Colman Products Limited: *See—*
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Reddy, Malireddy S.: *See—*
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Rederon, Christian Jackie; Souquet, Gerard Pierre; and Poullalion, Paul Louis, to C. G. Doris (Compagnie Generale pour les Developement Operationnels des Richesses Sous-marines); and Societe Francaise de Stockage Geologique GEOSTOCK. Formation of cavities in the bed of a sheet of water. 3,998,061, Cl. 61-88.000.
Redmond, Robert James: *See—*
Archey, William Bogan; Audi, Ronald Dominic; Clark, Roger James; and Redmond, Robert James, 3,999,105.
Redmore, Derek, to Petrolite Corporation. Diels-alder adducts of dihydro-nitrogen heterocyclic phosphoramidates. 3,998,833, Cl. 260-293.50S.
Reed, Thomas D.; and Propes, Kenneth L., to Rockwell International Corporation. Bi-directional signaling apparatus. 3,999,013, Cl. 178-58.00A.
Reed Tool Company: *See—*
Chitwood, Byron W.; and Keene, Kendall E., 3,998,283.
Robbins, Leonard J.; and Stewart, Lloyd D., 3,998,282.
Reese, Cecil E., to Du Pont de Nemours, E. I., and Company. Mixed shrinkage yarn. 3,998,042, Cl. 57-140.0BY.
Reese, Walter J., to PPG Industries, Inc. Transverse mechanism for winding fiber glass. 3,998,404, Cl. 242-158.300.
Reesman, Stanley H.: *See—*
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Regal, Raymond T.: *See—*
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Reichenbacher, Paul H.; Forsythe, Theresa M.; and Sparks, Allen K., to Universal Oil Products Company. Preparation of coumarins. 3,998,851, Cl. 260-343.20R.

Reichenberger, Helmut, to Siemens Aktiengesellschaft. Electrode for percutaneous polarographic measurements. 3,998,212, Cl. 128-2.00E.

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Reinbold, George W.; and Reddy, Malireddy S., to Leprino Cheese Co. Culture medium and method of preparing bulk starters for Italian cheese manufacture. 3,998,700, Cl. 195-96.000.

Reinwall, Ernest William, Jr., to Illinois Tool Works Inc. Roof panel fastener and joint construction. 3,998,019, Cl. 52-478.000.

Reiss, Charles; and Zuckerman, Leonard, to Servo Corporation of America. Pulse width detection circuit for electro-optical label reading system. 3,999,043, Cl. 235-61.11E.

Reliable Automatic Sprinkler Company, Inc., The: *See—*
Juliano, Richard F., 3,998,273.

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Research Corporation: *See—*
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Research Energy of Ohio, Inc.: *See—*
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Resorts International, Inc.: *See—*
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Reznikov, Ilya Emmanuilovich: *See—*
Semenov, Alexandr Nikolaevich; Klorikian, Vazgen Khorenovich; Prostov, Nariman Alexandrovich; Khalyavkin, Mikhail Dmitrievich; Reznikov, Ilya Emmanuilovich; Gergokov, Izmail Makhmudovich; Gapanovich, Jury Matveevich; Evdokimenkov, Nikolai Pavlovich; and Fishman, Josif Davydovich, 3,998,066.

Rheinmetall G.m.b.H.: *See—*
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Rhodarmer, Thomas C.: *See—*
Williams, Leland E.; Meredith, Glen B.; Ungurait, James R.; and Rhodarmer, Thomas C., 3,998,681.

Rhodes, William A. Outboard motor. 3,998,177, Cl. 115-18.00E.

Rhodes, William A. Alloy and method for producing the same. 3,998,633, Cl. 75-162.000.

Rhone-Poulenc S.A.: *See—*
Balme, Maurice; and Gruffaz, Max, 3,998,904.

Rice, James T.; and Chen, Chia M., to Research Corporation. Adhesive composition. 3,998,906, Cl. 260-838.000.

Richards, Glenn L.: *See—*
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Pommerening, Uwe A.; and Richards, Glenn L., 3,999,019.

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Richter, Sidney B.; and Levin, Alfred A., to Velsicol Chemical Corporation. Compositions of matter D-hetero-1,1-(α-thiocyanoacetyl) compounds. 3,998,808, Cl. 260-239.00B.

Ricks, Earl C.; and Vickers, Wiley B., to United States of America, Army. Shock absorbing hold-down latch. 3,999,059, Cl. 248-510.000.

Ricoh Co., Ltd.: *See—*
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Ridden, John Michael Charles: *See—*
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Riedel, Frederick H., to Conwed Corporation. Multiple purpose agricultural weed suppressant and growth enhancement blanket. 3,998,006, Cl. 47-9.000.

Rieter Machine Works, Ltd.: *See—*
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Rim, Yong S.: *See—*
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Ripley, Robert L.: *See—*
Hansen, Donald J.; De Atley, William B.; Ripley, Robert L.; and Curtis, George F., 3,998,631.

Riseman, Jacob, to International Business Machines Corporation. Novel beam-lead integrated circuit structure and method for making the same including automatic registration of beam-leads with corresponding dielectric substrate leads. 3,997,963, Cl. 29-578.000.

Rizzo, Victor L., to Upjohn Company, The. Formamidine insecticides. 3,998,969, Cl. 424-324.000.

Robbins, Leonard J.; and Stewart, Lloyd D., to Reed Tool Company. Earth boring auger. 3,998,282, Cl. 175-335.000.

Robbins, Medford Dwight: *See—*
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Roberts, Michael G.; and Bolen, Charles E., to Owens-Corning Fiberglas Corporation. Molding compounds. 3,998,909, Cl. 260-862.000.

Robertshaw Controls Company: *See—*
Braucksiek, Henry C., deceased, 3,998,425.
Katchka, Jay R.; and Braucksiek, Henry C., 3,998,582.

Robins, Milton, to PTI - Dolco. Apparatus for exerting a compressive force including friction gripping device therefore. 3,997,945, Cl. 24-129.00R.

Roccaforte, Harry I., to Hoerner Waldorf Corporation. Tape cassette hub retainers. 3,998,324, Cl. 206-387.000.

Rochat, Alain Claude: *See—*
Rody, Jean; Rochat, Alain Claude; Peterli, Hans Jakob; and Albrecht, Robert, 3,998,804.

Roche, Bernard G.; and Milon, Jean E. Synthesizer of multifrequency code signals. 3,999,049, Cl. 235-152.000.

Rockwell International Corporation: *See—*
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Hickman, Gordon W., 3,999,180.
Reed, Thomas D.; and Propes, Kenneth L., 3,999,013.
Wrigley, Charles Y.; and Kjar, Raymond A., 3,999,209.

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Rodemeyer, Donald James, to Metaframe Corporation. Animal activity apparatus. 3,998,187, Cl. 119-29.000.

Rodewald, Paul G., to Mobil Oil Corporation. Oil recovery by waterflooding employing graphite oxide for mobility control. 3,998,270, Cl. 166-275.000.

Rodolpho, Khaled A. Display rack. 3,998,335, Cl. 211-49.00D.

Rody, Jean; Rochat, Alain Claude; Peterli, Hans Jakob; and Albrecht, Robert, to Ciba-Geigy Corporation. Process for coupling of water-insoluble 2,4-disubstituted phenols with diazotized o-nitroanilines. 3,998,804, Cl. 260-206.000.

Rogers, Richard K., to National Geographic Society. Globe and measuring device. 3,997,980, Cl. 35-46.00R.

Rogic, Milorad M.; and Fuhrmann, Robert, to Allied Chemical Corporation. 2-Alkoxy-3-oximinocycloalkenes and production thereof. 3,998,882, Cl. 260-566.00A.

Rohland, Bernhard, to Gerro Holding Company Limited. Friction grommet. 3,998,561, Cl. 403-210.000.

Rohm and Haas Company: *See—*
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Rollei-Werke Franke & Heidecke: *See—*
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Rolm Corporation: *See—*
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Romanauskas, William A.; and Weyant, Oakley L., to Du Pont de Nemours, E. I., and Company. Gradient separation apparatus. 3,998,383, Cl. 233-26.000.

Romeu, Ramon. Universal milling machine. 3,998,127, Cl. 90-14.000.

Roos, Ernst: *See—*
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Root, Arthur A. Fruit picker. 3,998,038, Cl. 56-336.000.

Ropp, Emery J.: *See—*
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Ropp, Richard C.: *See—*
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Rosch, Gunter: *See—*
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Rose, Clark B.; and Kelley, Richard B., to Richards of Rockford. Apparatus for gas treatment of liquids. 3,998,389, Cl. 239-214.210.

Rosen, Ralph Sadler: *See—*
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Rosenbaum, Sheldon. Construction toy device. 3,998,003, Cl. 46-25.000.

Rosenberger, Michael, to Hoffmann-La Roche Inc. Preparation of epoxides. 3,998,856, Cl. 260-348.00R.

Rote, Franklin B. Cast iron. 3,998,664, Cl. 148-3.000.

Rothbauer, Heinrich: *See—*
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Roussel-UCLAF: *See—*
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Rowe International Inc.: *See—*
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Royal Business Machines, Inc.: *See—*
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Rubin, Robert M., to Outboard Marine Corporation. Power rake. 3,998,034, Cl. 56-11.300.

Rubino, Andrew M., to Armour Pharmaceutical Company. Aluminum-zirconium anti-perspirant systems with trace amounts of alkaline earth metals. 3,998,788, Cl. 424-47.000.

Rudd, Derek Austen, to George Kent Limited. Bonding of metals to solid electrolytes. 3,998,375, Cl. 228-122.000.

Rudd, Ross. Delayed bolt action for firearm. 3,998,126, Cl. 89-184.000.

Rufer, Willy: *See—*
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Rundzaitis, Alfons: *See—*
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Ruti Machinery Works Ltd.: *See—*
Weidmann, Erwin, 3,998,248.

Ruys, Frans Willem. Bicycle with drive levers. 3,998,469, Cl. 280-254.000.

Ryzhikov, Igor Veniaminovich: *See—*
Babenko, Vladimir Alexandrovich; Boeva, Galina Georgievna; Violin, Eduard Efimovich; Vodakov, Jury Alexandrovich; Ivanova, Eleonora Grigorievna; Kmita, Tatyana Georgievna; Pavlichenko, Vadim Ivanovich; Ryzhikov, Igor Veniaminovich; Kholuyanov, Georgy Fedorovich; Kruglov, Igor Ivanovich; Lomakina, Galina Alexandrovna; and Novikov, Vladimir Pavlovich, 3,999,206.

SA des Cableries et Trefileries de Cossonay: *See—*
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Sagami Chemical Research Center: *See—*
Ohtsuka, Yozo, 3,998,836.

Sagan, Stanley S., to Westinghouse Electric Corporation. Locking device for staggered fin-tubes. 3,998,268, Cl. 165-162.000.

Sai, Fumio: *See—*
Murata, Moriyasu; Yamanaka, Makoto; Sai, Fumio; and Fujino, Takashi, 3,998,762.

St. Clair, John Craig. Easily movable irrigation sprinkler system. 3,998,392, Cl. 239-547.000.

St. Jude Medical, Inc.: *See—*
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Saito, Mitsuru: *See—*
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Saito, Nagao; Kobayashi, Kazuhiko; and Oizumi, Toshiro, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for electrical discharge machining. 3,999,028, Cl. 219-69.00M.

Saito, Takao: *See—*
Umezono, Akimi; Kitayama, Minoru; Saito, Takao; and Wake, Ryousuke, 3,998,670.

Saito, Takeo; and Seki, Youichi, to Seiko Koki Kabushiki Kaisha. Exposure time control device of electric shutter for camera. 3,999,191, Cl. 354-23.00D.

Salem Corporation: *See—*
Harrell, John B., 3,998,703.

Salisbury, Charles W., to Owens-Illinois, Inc. Method of using invisible spacers for electro-optical display device manufacture. 3,998,510, Cl. 316-17.000.

Salisbury, Winfield W.; and Stiles, Walter J. Earth boring method employing high powered laser and alternate fluid pulses. 3,998,281, Cl. 175-16.000.

Salve S.A.: *See—*
Hytonen, Valjo Nikodemus, 3,998,225.

Salzgitter Maschinen Aktiengesellschaft: *See—*
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Sam Stein Associates, Inc.: *See—*
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Samans, Cecelia; and Spatz, Martin R., to Standard Oil Company (Indiana). Trithiophosphite stabilized maleic anhydride. 3,998,854, Cl. 260-346.80M.

Sammaritano, Michael. Nursing bottle. 3,998,348, Cl. 215-11.00E.

Sanders Associates, Inc.: *See—*
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Sandoz, Inc.: *See—*
Houlihan, William J.; and Nadelson, Jeffrey, 3,998,850.

Sandoz Ltd.: *See—*
Troxler, Fran; and Wiskott, Erik, 3,998,835.

Sandrick, John A. Portable press device. 3,997,961, Cl. 29-256.000.

Sankyo Company Limited: *See—*
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,998,699.

Santorilla, George M., to Clayton Environmental Consultants, Inc. Support system for a gas sampler. 3,998,102, Cl. 73-421.50R.

Sanwa Seiki Mfg. Co. Ltd.: *See—*
Kuroki, Masatake, 3,998,133.

Sarantakis, Dimitrios, to American Home Products Corporation. (Acyl-D-α-amino acid-gly-gly-tyr-ala)^1-somatostatin. 3,998,795, Cl. 260-78.00A.

Sardisco, John B.: *See—*
Adams, Ben E.; Sardisco, John B.; and Drechsel, Erhart K., 3,998,935.

Sargent, Cassius E., to PPC Industries, Inc. Bag structure and method of producing. 3,998,135, Cl. 93-35.00R.

Sartore, James J. A. Combination nail clipper, clipping receptacle and removable front lid. 3,997,966, Cl. 30-28.000.

Sasaki, Hiroo: *See—*
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Sato, Fumihiko: *See—*
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Sato, Hideo: *See—*
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Sato, Hiroshi: *See—*
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Sato, Kazuhiro; Eto, Yoshizumi; and Ishibashi, Shizuka, to Hitachi, Ltd.; and Hitachi Electronics Co., Ltd. Method and system for controlling electron beam quantity in camera tube. 3,999,011, Cl. 358-219.000.

Sato, Robert N.; and Prince, Paul R., to Hughes Aircraft Company. CCD selective transversal filter. 3,999,152, Cl. 333-70.00T.

Satterwhite, Charles R., to Unit Rig & Equipment Co. Angularly disposed single wheel excavator. 3,997,990, Cl. 37-189.000.

Sauer, Gerhard: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,998,847.

Saunders, William T., to National Steel Corporation. Light-weight, high-strength, drawn and ironed, flat rolled steel container body method of manufacture. 3,998,174, Cl. 113-120.00H.

Sawyer, Willard H.: *See—*
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Schaefer, Josef, to Bremshey Aktiengesellschaft. Guide rail arrangement for vehicle seats. 3,998,420, Cl. 248-429.000.

Schanzer, Wilhelm: *See—*
Berg, Gerhard; Nordsiek, Karl-Heinz; Maahs, Gunter; and Schanzer, Wilhelm, 3,998,778.

Schecker, Hans-Georg: *See—*
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Scheerhorn, Douglas, to Steelcase, Inc. Gang locking mechanism. 3,998,508, Cl. 312-221.000.

Scheler, Robert L.: *See—*
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Schellenberg, Hans: *See—*
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Schering Aktiengesellschaft: *See—*
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Schering Corporation: *See—*
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Schien, Albert: *See—*
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Schinzel, Erich: *See—*
Mengler, Helmut; Rosch, Gunter; Schinzel, Erich; and Smerz, Otto, 3,998,812.

Schlafer, Ludwig; and Flemmig, Karl-Heinz, to Hoechst Aktiengesellschaft. Process for the differential dyeing of polyamide fibers and of materials containing them. 3,998,586, Cl. 8-21.00B.

Schlinger, Warren G.: *See—*
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Schlumberger Technology Corporation: *See—*
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Schmerling, Louis, to UOP Inc. Preparation of polychloroalkenyl aromatic compounds. 3,998,895, Cl. 260-651.00R.

Schmerling, Louis: *See—*
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Schmidhammer, Ludwig: *See—*
Fruhwirt, Otto; Frey, Hellmuth; and Schmidhammer, Ludwig, 3,998,706.

Schmidt, Charles E., to GTE Automatic Electric Laboratories Incorporated. Network with single amplifier for simulating FDNR circuit. 3,999,154, Cl. 333-80.00R.

Schmidt, Hans: *See—*
Mainka, Helmut; Schmidt, Hans; and Grosshennig, Gunther, 3,998,148.

Schmidt, Johann, to Marker, Hannes. Safety ski-binding. 3,998,473, Cl. 280-618.000.

Schmidt, Paul Joseph: *See—*
Crounse, Nathan Norman; and Schmidt, Paul Joseph, 3,998,825.
Crounse, Nathan Norman; and Schmidt, Paul Joseph, 3,998,826.

Schmitt-Henco, Carl Heinrich; and Rauschenfels, Eberhard, to Dyckerhoff Zementwerke A.G. Expanded synthetic calcium silicates. 3,998,650, Cl. 106-118.000.

Schneible Company: *See—*
Lundy, Alvin S., 3,998,612.

Schon, Lars G.: *See—*
Reilly, Joseph R.; and Schon, Lars G., 3,998,331.

Schonberger, Helmut; Wolfsberger, Manfred; and Funke, Walter, to General Motors Corporation. Internal combustion engine air induction assembly. 3,998,614, Cl. 55-417.000.

Schranz, Karl-Wilhelm; and Kunitz, Friedrich-Wilhelm, to AGFA-Gevaert, A.G. Photographic material containing yellow couplers. 3,998,641, Cl. 96-100.000.

Schriber, Stanley O.: *See—*
Funk, L. Warren; and Schriber, Stanley O., 3,999,096.

Schroeder, David Lee: *See—*
Baum, Kurt; Baum, Joerg Peter; Pearce, Jai Kumar; and Schroeder, David Lee, 3,998,626.
Schroter, Friedrich. Process and apparatus for punching sheets or webs of paper, cardboard or similar material. 3,998,119, Cl. 83-328.000.
Schroter, Herbert; and Dennhardt, Werner, to Hoechst Aktiengesellschaft. Process and apparatus for automatically changing the illumination intensity of the light source in a copying apparatus. 3,998,547, Cl. 355-68.000.
Schubart, Rudiger; Blazejak, Manfred; and Roos, Ernst, to Bayer Aktiengesellschaft. Chlorothio-N-phthalimide and process therefor. 3,998,841, Cl. 260-326.00S.
Schultheiss, Wolfram; and Hoffmann, Harald, to Carl Freudenberg, Firma. Carrier sleeve. 3,997,929, Cl. 8-155.100.
Schultz, Edward D. Conveyor wash device. 3,998,321, Cl. 198-495.000.
Schultz, Fred B.: *See—*
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Schulze, Axel; and Borejko, Stefan, to Rollei-Werke Franke & Heidecke. Electronic photographic flash unit. 3,998,534, Cl. 352-200.000.
Schumacher, John P.; and Hollenbeck, William F., to Gulf & Western Manufacturing Company. Press slide with extendable and retractable tool support. 3,998,087, Cl. 72-349.000.
Schumann, Erwin: *See—*
Schuster, Rolf; and Schumann, Erwin, 3,998,441.
Schupner, Willard J., to Efdyn Corporation. Adjustable shock absorber unit. 3,998,302, Cl. 188-285.000.
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Schuster, Lee: *See—*
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Schuster, Rolf, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Conveying apparatus for heat treatment furnaces. 3,998,323, Cl. 198-835.000.
Schuster, Rolf; and Schumann, Erwin, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Furnace for tempering and hardening workpieces. 3,998,441, Cl. 266-250.000.
Schuster, Wilhelm: *See—*
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Seng, Florin, to Bayer Aktiengesellschaft. Process for the production of 1-acyloxy alkylene phosphonic acid dialkyl esters. 3,998,915, Cl. 260-971.000.
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Stout, Ernest G.; and Thornburg, Francis L., to Lockheed Aircraft Corporation. Hydro-ski craft. 3,998,176, Cl. 114-283.000.

Strametz, Helmut; Leugering, Hans Joachim; Rust, Kurt; and Engelmann, Manfred, to Hoechst Aktiengesellschaft. Polypropylene molding composition and process for its preparation. 3,998,911, Cl. 260-878.00B.

Straub, Roy H. Flexible wall plastic bottle filling apparatus and method. 3,998,030, Cl. 53-37.000.

Strauss, Georg: *See—*
Stendel, Joachim; Portz, Wilhelm; Strauss, Georg; Weiler, Heinrich; Moormann, Gunther; and Witt, Horst, 3,998,928.

Strauss, Werner, to Klockner-Humboldt-Deutz Aktiengesellschaft. Settling classifier for sorting mineral raw materials. 3,998,728, Cl. 209-172.500.

Streng, Ludwig. Spherical sector for sensor probe. 3,999,120, Cl. 324-34.0TK.

Strnat, Karl, to Th. Goldschmidt AG. Permanent magnet on the basis of cobalt-rare earth alloys and method for its production. 3,998,669, Cl. 148-31.570.

Stromberg-Carlson Corporation: *See—*
Fucito, Dermot Thomas, 3,999,137.
Kelly, Patrick M.; and Russell, Stanley L., 3,999,085.
Pommerening, Uwe A.; and Richards, Glenn L., 3,999,018.
Pommerening, Uwe A.; and Richards, Glenn L., 3,999,019.

Strousser, Penelope. Means for keeping track in weaving operations. 3,998,246, Cl. 139-1.00R.

Strozewski, Casimir S.: *See—*
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Stubbmann, Albert. Animatable musical toothbrush holder. 3,998,234, Cl. 132-84.00R.

Stuck, Walter: *See—*
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Stuckey, Alfred R. Rope conditioning apparatus. 3,997,978, Cl. 34-104.000.

Stuhmer, Werner: *See—*
Milkowski, Wolfgang; Budden, Renke; Funke, Siegfried; Huschens, Rolf; Liepmann, Hans-Gunther; Stuhmer, Werner; and Zeugner, Horst, 3,998,809.

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Sturmer, Anton: *See—*
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Sudholt, Kenneth J. Reciprocating engine. 3,998,200, Cl. 123-197.00R.

Suga, Shigeru. Device for measuring stimulus values of the color of a liquid. 3,998,551, Cl. 356-73.000.

Sugawara, Fumio: *See—*
Yomoto, Chobe; Adachi, Takashi; Nakajima, Yutaka; Hidaka, Hidemasa; Yoshida, Tsukasa; and Sugawara, Fumio, 3,998,696.

Sullivan, William M., to General Motors Corporation. Drum brake shoe. 3,998,300, Cl. 188-250.00A.

Sulzer Brothers Limited: *See—*
Pfarrwaller, Erwin, 3,998,249.
Vyskocil, Jiri, 3,998,108.

Sumitomo Bakelite Company, Limited: *See*—
Yoshioka, Akira, 3,998,789.
Sumitomo Chemical Company, Limited: *See*—
Fukumura, Masataka; Maeshima, Kaoru; and Okano, Shigeru, 3,998,817.
Mizutani, Toshio; Itaya, Nobushige; Ohno, Nobuo; Matsuo, Takashi; Kitamura, Shigeyoshi; and Okuno, Yositosi, 3,998,868.
Okazaki, Hiroyuki; and Suzuki, Yasuyuki, 3,998,645.
Sumitomo Welding Electrode Co. Ltd.: *See*—
Miyao, Nobuaki; Kosuge, Kunihiro; Yoshida, Saijiro; Uchiyama, Kanaaki; Tanimoto, Hiroshi; Mimaki, Kazunao; and Goto, Satoru, 3,999,035.
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Muratov, Viktor Alexeevich; Chigarev, Valery Vasilievich; Malinov, Leonid Solomonovich; Surzhikova, Ljudmila Avenirovna; Tarasov, Vyacheslav Vasilievich; Manov, Vladimir Mikhailovich; Kolechko, Alexei Afanasievich; and Zarechensky, Anatoly Vasilievich, 3,999,036.
Sutherland, Gordon, to Hercules Incorporated. Preparation of activated carbonaceous material from sewage sludge and sulfuric acid. 3,998,756, Cl. 252-422.000.
Suzuki, Noboru; and Kamiya, Yozi, to Toyoda Machine Works, Limited. Automatic tool changing apparatus. 3,998,338, Cl. 214-1.0BC.
Suzuki, Tadao: *See*—
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Suzuki, Yasuyuki: *See*—
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Symon, Ted; and Christensen, Nils J., to Universal Oil Products Company. Preparation of unsaturated carbonyl compounds. 3,998,872, Cl. 260-483.000.
Syntex Corporation: *See*—
Fried, John H.; and Harrison, Ian T., 3,998,966.
Syntex (U.S.A.) Inc.: *See*—
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Moffatt, John G., 3,998,807.
Syva Company: *See*—
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Szegvari, Andrew, to Union Process International, Inc. Method and apparatus for grinding particulate solids. 3,998,938, Cl. 423-594.000.
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Tajima, Katsutoshi: *See*—
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Takagi, Toshinori, to Sharp Kabushiki Kaisha. Beam-plasma type ion source. 3,999,072, Cl. 250-427.000.
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Takeda, Masashi; and Matsuzaki, Atsushi, to Sony Corporation. Peak detector having signal rise-time enhancement. 3,999,125, Cl. 324-103.00P.
Takeichi, Chiyoko: *See*—
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,998,699.
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Takenaka, Shigeo; Shimizu, Hitoshi; Iwamoto, Akira; and Kuroda, Yasuo, to Nippon Kayaku Co., Ltd. Process for the simultaneous preparation of methacrylonitrile and 1,3-butadiene. 3,998,867, Cl. 260-465.300.
Takeuchi, Akitoshi: *See*—
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Takeuchi, Takeshi; and Manabe, Yukio, to Hochiki Corporation. Visitor confirmation system. 3,999,006, Cl. 358-85.000.
Takigawa, Masahiro: *See*—
Miura, Mitsuo; Takigawa, Masahiro; Miyaguchi, Masao; Yamada, Hiromichi; Uchizaki, Iwao; Ochiai, Minoru; and Ishikawa, Yoshihiro, 3,998,201.
Tamaru, Munetaka; Kume, Kazunari; Oono; Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, to Citizen Watch Co., Ltd. Electric timepiece for displaying the operating condition thereof. 3,998,043, Cl. 58-23.00R.
Tanaka Seiki Co., Ltd.: *See*—
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Tanaka, Susumu: *See*—
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Tanikoshi, Kinji, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Speed regulation system for DC motors with hall generators. 3,999,108, Cl. 318-138.000.
Tanimoto, Hiroshi: *See*—
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Tarkkanen, Veikko, to Packard Instrument Company, Inc. Composition for use in scintillator systems. 3,999,070, Cl. 250-362.000.
Taub, Bernard, to Allied Chemical Corporation. Aerosol latex paint containing imidazoline surfactants. 3,998,775, Cl. 260-29.6MN.
Taub, David: *See*—
Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., 3,998,849.
Tauber, George: *See*—
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Tax, Hans; and Hosler, Klaus, to Tax, Hans. Crane with compensating counterweight. 3,998,336, Cl. 212-48.000.
Taylor, Allen L.; and McFadden, Francis J., to Minnesota Mining and Manufacturing Company. Pyroelectric temperature compensated sensing device employing differential amplifier. 3,999,069, Cl. 250-338.000.
Taylor, Glenn R.: *See*—
Kellogg, Walter J.; Taylor, Glenn R.; and Gary, Wardell, 3,999,176.
Taylor, James H., Jr.: *See*—
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Taylor, John Bodenham; Ramm, Peter John; and Fried, Ferdinand, to Roussel-UCLAF. Novel derivatives of maleopimaric acid. 3,998,823, Cl. 260-247.20A.
Taylor, John M., Jr., to Standard Oil Company (Indiana). Well casing corrosion meter. 3,999,121, Cl. 324-65.0CR.
Teach, Eugene G.: *See*—
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Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., to Cosden Technology, Inc. Ethylene-vinyl halide-alkyl vinyl terpolymer emulsions. 3,998,774, Cl. 260-29.60T.
Teijin Limited: *See*—
Shimomai, Akiro; Fujimoto, Iwao; Hamana, Isao; and Katayama, Kiyoji, 3,998,988.
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Terayama, Mutsuo; and Yamamoto, Kenji, to Yamamoto Kagaku Gosei Kabushiki Kaisha. Process for preparing dibenzylamino fluoran compounds. 3,998,846, Cl. 260-335.000.
Terhoeven, Franz-Josef. Footwear. 3,997,983, Cl. 36-72.00R.
Terminal Data Corporation: *See*—
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Thibodeau, Joseph C. Fault detection indication system. 3,999,175, Cl. 340-253.00R.

Thiel, Max: *See—*
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Thivend, Jean: *See—*
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Thoener, Gerhard, to Siemens Aktiengesellschaft. Digital voltage level measuring device. 3,999,123, Cl. 324-99.00D.

Thomas, Carmen Van: *See—*
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Thomas, Richard C., Jr.; and Harpootlian, Harry, to Upjohn Company, The. 6-Amino-4-(substituted piperidino)-1,2-dihydro-1-hydroxy-2-iminopyrimidines. 3,998,827, Cl. 260-256.40C.

Thornburg, Francis L.: *See—*
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Thorne, Donald James. Telephone apparatus. 3,999,017, Cl. 179-6.00D.

Thrower, Stephen Whitney; Criss, George Hugh; and Moniot, Daniel Eusebius, to Dresser Industries, Inc. Monolithic refractories. 3,998,648, Cl. 106-67.000.

Tieman, Lloyd E., to Flex-O-Lators, Inc. Spring edge for furniture decks. 3,998,371, Cl. 267-102.000.

Tien, Ping King: *See—*
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TII Corporation: *See—*
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Ting, Raymond M. L., to H. H. Robertson Company. Blow-in/blow-out wall structure. 3,998,016, Cl. 52-232.000.

Tinkham, Leland P.; and Cline, Edwin Lee, to Clayton Manufacturing Company. Method and apparatus for quickly evaluating engine exhaust gas emissions. 3,998,095, Cl. 73-117.000.

Toews, Leonard E., to Kennametal Inc. Dirt runner and support therefor. 3,997,934, Cl. 15-246.000.

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Toledo, Emil; Seavey, Marden H., Jr.; and McNamara, Joseph P., to United States of America, Navy. Discontinuous chromium film for memory element. 3,999,174, Cl. 340-174.0PW.

Toledo-Pereyra, Luis H.: *See—*
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Tomibe, Shinji; Arai, Michio; and Higashi, Kiyoshi, to Kuraray Co., Ltd.; and Nippon Sanmo Sensyoku Co., Ltd. Package dyeing method. 3,998,585, Cl. 8-19.000.

Tomlinson, Audie B. Backhoe. 3,997,987, Cl. 37-103.000.

Tomoegawa Paper Mfg. Co., Ltd.: *See—*
Kirigaya, Kiichi; Ogiwara, Makoto; Koseki, Syosaku; and Yamaguchi, Toshiho, 3,998,987.

Toms, Howard L.: *See—*
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Tone, Hisashi; and Chujyo, Tadao, to Hokko Co., Ltd. Device for replacing packings of flange joints. 3,997,957, Cl. 29-239.000.

Tong, Alvin H.: *See—*
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Torok, Vilmos, to Allmanna Svenska Elektriska Aktiebolaget. Arrangement in current supply systems. 3,998,305, Cl. 191-5.000.

Toth, Tibor, to Hoechst Aktiengesellschaft. Process for the manufacture of a mixed catalyst. 3,998,996, Cl. 526-114.000.

Toto, John A.; and Pennings, William E., to Pitney-Bowes, Inc. Photoconductor storing apparatus for an electrostatic copier. 3,998,542, Cl. 355-16.000.

Townsend, Franklin L., to Barber-Colman Company. Heddle transfer stop motion in a triaxial weaving machine. 3,998,250, Cl. 139-336.000.

Townsend, Leroy B., to United States of America, Health, Education and Welfare. α- and β-2'-Deoxy-6-R-substituted selenoguanosine compounds. 3,998,806, Cl. 536-24.000.

Towson, Arthur L., Jr., to Chisholm-Ryder Company, Inc. Pod combine. 3,998,035, Cl. 56-13.500.

Toyo Boseki Kabushiki Kaisha: *See—*
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Toyo Soda Manufacturing Co., Ltd.: *See—*
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Toyoda Machine Works, Limited: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Tradowsky, Michael. Remote control response system for classroom use. 3,997,981, Cl. 35-48.00R.

Traut, Earl W. Toothed rolling contact devices. 3,998,506, Cl. 308-205.000.

Tretter, Ted A., to Raymond Lee Organization, Inc., The, a part interest. Hitch pin device. 3,998,472, Cl. 280-515.000.

Trevillyan, Alvin E., to Standard Oil Company (Indiana). Heterogeneous catalyst for the hydroformylation of olegins. 3,998,864, Cl. 260-439.00R.

Triboulet, Robert G.: *See—*
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Troxler, Fran; and Wiskott, Erik, to Sandoz Ltd. 1-Substituted amino-3-thieno-[3,2-c]pyridinyloxy-2-propanols. 3,998,835, Cl. 260-294.80C.

Trumbull, William E.: *See—*
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Trumbull, William Ernest; and Cogley, James Joseph, to Trumbull, William E.; and Cogley, James J., part interest to each. Surgical retractor device. 3,998,217, Cl. 128-20.000.

TRW Inc.: *See—*
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Tsang, Paul J.: *See—*
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Tsumura, Kohei: *See—*
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Tsuneda, Terukuni, to Canon Kabushiki Kaisha. Liquid developer comprising heat treated rubber for use in development of an electrostatic latent image and method of making developer. 3,998,746, Cl. 252-62.10L.

Tuft, Bernard R.: *See—*
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Tull, Roger J.; and Melillg, David G., to Merck & Co., Inc. Process of preparing 5-fluoro-2-methyl-1-(paramethylsulfinylbenzylidene)-indenyl-3-acetic acid. 3,998,875, Cl. 260-515.00A.

Tune, George Albert, to Ransome Hoffmann Pollard Limited. Clutch release mechanism. 3,998,507, Cl. 308-233.000.

Turner, James Keith: *See—*
Bost, Curtis C.; Irwin, Eugene Scott; Keineth, Thomas M.; Russell, Robert Q.; Ince, Harsch C., Jr.; Parsons, Gary L.; and Turner, James Keith, 3,998,740.

Turner, Joe D. Rodeo training device. 3,997,979, Cl. 35-29.00R.

Tveekrem, James O.: *See—*
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Twedell, Jack L. Take-off fitting for low pressure non-metallic duct systems. 3,998,480, Cl. 285-189.000.

Typrowicz, Wladyslaw: *See—*
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Uddeholms Aktiebolag: *See—*
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Udvardi-Lakos, Janos, to Siemens Aktiengesellschaft. Interruption free inverter power supply. 3,999,078, Cl. 307-66.000.

Ueda, Tateki; Shimizu, Terumasa; and Oguma, Shinichi, to Pioneer Electronic Corporation. Automatic telephone answering and message recording apparatus. 3,999,016, Cl. 179-6.00E.

Uetrecht, Dale M., to D. H. Baldwin Company. Modulation system. 3,999,149, Cl. 332-17.000.

Uldricks, Charles D.; and Kiralfy, Alexander Enrico, to Uldricks, Charles D. Air operated load balancing hoist. 3,998,432, Cl. 254-168.000.

Ullman, Edwin F., to Syva Company. Double receptor fluorescent immunoassay. 3,998,943, Cl. 424-12.000.

Umezono, Akimi; Kitayama, Minoru; Saito, Takao; and Wake, Ryousuke, to Nippon Steel Corporation. Process for producing steel plate substrates for lacquering. 3,998,670, Cl. 148-6.200.

Umphrey, Ronald W., to Continental Oil Company. Low profile sump with submerged transverse roll crusher. 3,998,395, Cl. 241-46.110.

Umphrey, Ronald W.; and McCain, David L., to Continental Oil Company. Scalping apparatus for a low profile two-roll crusher. 3,998,396, Cl. 241-81.000.

Ungurait, James R.: *See—*
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B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
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B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
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B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
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B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
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B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976	B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976	B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976	B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976	B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976	B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976	B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976	B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976	B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976	B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976	B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976	B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976	B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976	B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976	B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976	B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976	B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976	B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976	B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976	B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976	B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976	B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976	B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976	B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976	B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976	B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976	B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976	B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976	B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976	B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976	B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976	B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976	B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976	B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976	B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976	B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976	B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976	B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976	B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976	B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976	B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976	B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976	B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976	B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976	B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976	B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976	B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976	B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976	B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976	B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976	B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976	B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976	B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976	B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976	B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976	B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976	B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976	B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976	B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976	B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976	B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976	B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976	B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976	B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976	B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976	B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976	B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976	B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976	B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976	B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976	B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976	B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976	B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976	B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976	B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976	B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976	B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976	B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976	B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976	B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976	B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976	B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976	B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976	B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976	B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976	B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976	B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976	B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976	B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976	B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976	B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976	B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976	B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976	B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976	B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976	B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976	B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976	B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976	B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976	B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976	B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976	B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976	B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976	B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976	B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976	B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976	B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976	B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976	B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976	B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976	B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976	B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976	B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976	B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976	B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976	B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976	B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976	B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976	B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976	B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976	B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976	B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976	B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976	B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976	B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976	B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976	B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976	B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976	B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976	B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976	B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976	B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976	B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976	B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976	B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976	B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976	B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976	B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976	B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976	B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976	B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976	B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976	B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976	B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976	B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976	B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976	B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976	B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976	B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976	B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976	B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976	B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976	B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976	B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976	B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976	B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976	B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976	B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976	B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976	B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976	B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976	B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976	B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976	B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976	B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976	B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976	B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976	B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976	B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
b 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976	B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976	B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976	B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976	B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976	B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976	B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976	B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976	B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976	B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976	B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976	B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976	B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976	B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976	B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976	B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976	B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976	B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976	B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF DECEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aktieselskabet Niro Atomizer: *See—*
Nielsen, Kaj, Re. 29,083.

Anderson, Robert F.; and Vora, Bipin V., to Universal Oil Products Company. Separate recycle of regenerated acid and of isoparaffin from HF catalyst regeneration zone. Re. 29,084, Cl. 260-683.410.

Hirsch, James Arthur: *See—*
Murphy, Robert M.; and Hirsch, James Arthur, Re. 29,086.

Murphy, Robert M.; and Hirsch, James Arthur, to P. R. Mallory & Co., Inc. Adjustable interval time switch device. Re. 29,086, Cl. 307-141.000.

Nielsen, Kaj, to Aktieselskabet Niro Atomizer. Atomizer wheel for the atomization of suspensions of hard-wearing materials. Re. 29,083, Cl. 239-224.000.

P. R. Mallory & Co., Inc.: *See—*
Murphy, Robert M.; and Hirsch, James Arthur, Re. 29,086.

Spectral Data Corporation: *See—*
Yost, Edward F., Jr., Re. 29,085.

Universal Oil Products Company: *See—*
Anderson, Robert F.; and Vora, Bipin V., Re. 29,084.

Vora, Bipin V.: *See—*
Anderson, Robert F.; and Vora, Bipin V., Re. 29,084.

Yost, Edward F., Jr., to Spectral Data Corporation. Spectral-zonal color reconnaissance system. Re. 29,085, Cl. 354-68.000.

LIST OF PLANT PATENTEES

Irwin, Lawrence T. Kalanchoe plant. 3,992, 12-21-76, Cl. 68.000.

Jackson & Perkins Company: *See—*
Suzuki, Seizo, 3,996.
Warriner, William A., 3,994.
Warriner, William A., 3,995.
Warriner, William A., 3,997.
Warriner, William A., 3,998.

Steppe, Clarence M. Pink sachet-pink flowering dogwood tree. 3,993, 12-21-76, Cl. 51.000.

Suzuki, Seizo, to Jackson & Perkins Company. Rose plant. 3,996, 12-21-76, Cl. 2.000.

Warriner, William A., to Jackson & Perkins Company. Rose plant. 3,994, 12-21-76, Cl. 28.000.

Warriner, William A., to Jackson & Perkins Company. Rose plant. 3,995, 12-21-76, Cl. 22.000.

Warriner, William A., to Jackson & Perkins Company. Rose. 3,997, 12-21-76, Cl. 11.000.

Warriner, William A., to Jackson & Perkins Company. Rose plant. 3,998, 12-21-76, Cl. 11.000.

LIST OF DESIGN PATENTEES

American Excelsior Company: *See—*
Morris, June M., 242,825.

American Optical Corporation: *See—*
Armbruster, John T., 242,790.
Armbruster, John T., 242,791.
Beane, Richard M., 242,788.
Canavan, Richard William, III, 242,789.

Armbruster, John T., to American Optical Corporation. Microscope vertical fluorescent illuminator. 242,790, 12-21-76, Cl. D16-83.000.

Armbruster, John T., to American Optical Corporation. Multi-viewing microscope attachment. 242,791, 12-21-76, Cl. D16-83.000.

Aro-Sac Inc.: *See—*
Saccoccio, Nazareno J., 242,817.

B & J Rocket (Hong Kong) Limited: *See—*
Jensen, Wayne E., 242,760.

Baader, Joseph E. School bus flasher circuitry module. 242,781, 12-21-76, Cl. D10-121.000.

Baskin-Robbins Ice Cream Co.: *See—*
Richman, Leon H.; and Clayton, James Michael, 242,755.

Beane, Richard M., to American Optical Corporation. Pair of spectacles. 242,788, 12-21-76, Cl. D16-65.000.

Blankenship, Arthur C., to Uniroyal, Inc. Pneumatic tire tread and buttress. 242,785, 12-21-76, Cl. D12-147.000.

Boren, Charles F. Shoulder contour garment hanger. 242,756, 12-21-76, Cl. D6-256.000.

Brissenden, Rose. Rag doll. 242,814, 12-21-76, Cl. D34-4.00R.

Canavan, Richard William, III, to American Optical Corporation. Pair of spectacles. 242,789, 12-21-76, Cl. D16-65.000.

Cannon, Michael A., to Micon Industries. Electroluminescent character X. 242,821, 12-21-76, Cl. D64-12.00B.

Cannon, Michael A., to Micon Industries. Electroluminescent character R. 242,822, 12-21-76, Cl. D64-12.00B.

Cannon, Michael A., to Micon Industries, a California Corporation. Electroluminescent character K. 242,823, 12-21-76, Cl. D64-12.00B.

Cannon, Michael A., to Micon Industries, a California Corporation. Electroluminescent character B. 242,824, 12-21-76, Cl. D64-12.00B.

Capitol Products Corporation: *See—*
Schmidt, Dietrich F., 242,799.
Schmidt, Dietrich F., 242,800.

Carlton, Robert S. Door fastener. 242,763, 12-21-76, Cl. D8-109.000.

Cathey, Wayne Carl, to Xerox Corporation. Console enclosure for electronic equipment. 242,805, 12-21-76, Cl. D26-5.00C.

Certain-teed Corporation: *See—*
Schuss, Phillip, 242,801.
Schuss, Phillip, 242,802.
Schuss, Phillip, 242,803.
Schuss, Phillip, 242,804.

Christen Incorporated: *See—*
Christen, Louis J., Jr., 242,753.

Christen, Louis J., Jr., to Christen Incorporated. Stand for potted plants. 242,753, 12-21-76, Cl. D6-183.000.

Chrysler Corporation: *See—*
McCaughin, William M., 242,777.

Clayton, James Michael: *See—*
Richman, Leon H.; and Clayton, James Michael, 242,755.

Concept Galleries, Inc.: *See—*
Plesset, Michael, 242,812.

CTP Industries, Inc.: *See—*
Kamins, Seymour, 242,764.

Dart Industries Inc.: *See—*
Lahay, Charles A., 242,828.
Painter, David L.; and Duquaine, Edward J., Jr., 242,759.

Davis, Jack E., to Victor Comptometer Corporation. Artificial fish lure. 242,795, 12-21-76, Cl. D22-27.000.

de Massacre, Guy. Boot. 242,746, 12-21-76, Cl. D2-272.000.

Denki Onkyo Co., Ltd.: *See—*
Fukuda, Yoshinori; and Takahashi, Kiichi, 242,809.

Dewar, Donald D.: *See—*
Graham, Joseph A.; Stephenson, Reginald M.; and Dewar, Donald D., 242,748.

DiCarlo, Vincent S. Snow shovel. 242,761, 12-21-76, Cl. D8-10.000.

Dow Chemical Company, The: *See—*
Patrick, Frank D., 242,765.

Duquaine, Edward J., Jr.: *See—*
Painter, David L.; and Duquaine, Edward J., Jr., 242,759.

Ebauches S.A.: *See—*
Huguenin, Freddy, 242,774.

Edson, Sydney: *See—*
Howard, Fred; and Edson, Sydney, 242,754.

Elliott, Robert B. Femoral prosthesis. 242,827, 12-21-76, Cl. D83-1.00E.

Empire Brushes, Inc.: *See—*
Misercola, Douglas, 242,750.

Figur, Bernd: *See—*
Stuetzer, Franz Alban; and Figur, Bernd, 242,811.

Forsty, William A.; and Mayer, Donald K., to Thermo King Corporation. Truck body mounted refrigeration unit. 242,798, 12-21-76, Cl. D23-142.000.

Frohling, Lucien O., to General Foods Corporation. Bottle. 242,769, 12-21-76, Cl. D9-67.000.

Frohling, Lucien O'Dendal, to General Foods Corporation. Bottle. 242,768, 12-21-76, Cl. D9-67.000.

Fukuda, Yoshinori; and Takahashi, Kiichi, to Denki Onkyo Co., Ltd. Tape recorder. 242,809, 12-21-76, Cl. D26-14.00B.

General Foods Corporation: *See—*
Frohling, Lucien O., 242,769.
Frohling, Lucien O'Dendal, 242,768.

Glasier, Stuart: *See—*
Jacobson, Andrew K.; and Glasier, Stuart, 242,783.

Goble, Ralph W.; and Hackett, Kenneth R., to Sonitrix, Inc. Ultrasonic intrusion alarm. 242,778, 12-21-76, Cl. D10-106.000.

Goble, Ralph W.; and Hackett, Kenneth R., to Sontrix, Inc. Ultrasonic intrusion alarm. 242,779, 12-21-76, Cl. D10-106.000.

Graham, Joseph A.; Stephenson, Reginald M.; and Dewar, Donald D. Combined snow brush and ice scraper. 242,748, 12-21-76, Cl. D4-06.000.

Graphic Marking Systems, Inc.: *See—*
Moberg, Robert S., 242,808.

Hackett, Kenneth R.: *See—*
Goble, Ralph W.; and Hackett, Kenneth R., 242,778.
Goble, Ralph W.; and Hackett, Kenneth R., 242,779.

Hanes Corporation: *See—*
Howard, Fred; and Edson, Sydney, 242,754.

Howard, Fred; and Edson, Sydney, to Hanes Corporation. Display stand. 242,754, 12-21-76, Cl. D6-188.000.

Huguenin, Freddy, to Ebauches S.A. Wrist watch. 242,774, 12-21-76, Cl. D10-38.000.

Hunt, Ronald E.; Jenkins, William M.; and Noyes, Eliot F., to International Business Machines Corporation. Dictation machine or the like. 242,807, 12-21-76, Cl. D26-14.00B.

Injection Plastic Co., Inc., The: *See—*
Strang, Robert E., 242,758.

International Business Machines Corporation: *See—*
Hunt, Ronald E.; Jenkins, William M.; and Noyes, Eliot F., 242,807.

J. I. Case Company: *See—*
Maurer, Herman Joseph, 242,816.

Jacobson, Andrew K.; and Glasier, Stuart. Tricycle body. 242,783, 12-21-76, Cl. D12-112.000.

Jakobsen, William J., to Lourdes Industries, Inc. Pressure monitoring unit for telephone cables or the like. 242,776, 12-21-76, Cl. D10-75.000.

Jenkins, William M.: *See—*
Hunt, Ronald E.; Jenkins, William M.; and Noyes, Eliot F., 242,807.

Jensen, Wayne E., to B & J Rocket (Hong Kong) Limited. Combined fork and chopstick. 242,760, 12-21-76, Cl. D7-149.000.

Jimenez, Fernando L.: *See—*
Posh, Rosa L.; and Jimenez, Fernando L., 242,826.

Johnson, Kendall R., to Universal Cooperatives, Inc. Milk line check valve. 242,797, 12-21-76, Cl. D23-22.000.

Kaga, Takashi, to Tomy Kogyo Co., Inc. Toy jack-in-the-box. 242,815, 12-21-76, Cl. D34-15.00R.

Kamins, Seymour, to CTP Industries, Inc. Combined hook and handle for a carrier bag. 242,764, 12-21-76, Cl. D8-154.000.

Kane, George R. Chart board. 242,794, 12-21-76, Cl. D19-89.000.

Kane, Michael J., to Xerox Corporation. Educational aide for measuring mass. 242,787, 12-21-76, Cl. D19-62.000.

Kane, Michael J., to Xerox Corporation. Educational aide for teaching physical properties of light. 242,793, 12-21-76, Cl. D19-62.000.

Kelley, Dale T. Safety flasher. 242,780, 12-21-76, Cl. D10-114.000.

Kerr, Wally G. Combined pole lamp and ventilator. 242,819, 12-21-76, Cl. D48-20.00D.

Kresge, Richard E.: *See—*
Licari, Anthony; Miller, Jerry H.; and Kresge, Richard E., 242,773.

Lahay, Charles A., to Dart Industries Inc. Medical suction instrument tip. 242,828, 12-21-76, Cl. D83-12.00A.

Licari, Anthony; Miller, Jerry H.; and Kresge, Richard E., to Thiokol Corporation. Foam dispensing cap. 242,773, 12-21-76, Cl. D9-258.000.

Loftus, Barry Noel. Pen. 242,792, 12-21-76, Cl. D19-49.000.

Lourdes Industries, Inc.: *See—*
Jakobsen, William J., 242,776.

Mar-Line Displays Inc.: *See—*
Wells, Stanley, 242,751.

Marlow, Michael David. Bottle. 242,772, 12-21-76, Cl. D9-194.000.

Matthews, Billy H. Hand operated thread looping machine. 242,749, 12-21-76, Cl. D3-19.00A.

Maurer, Herman Joseph, to J. I. Case Company. Cab for construction tractor. 242,816, 12-21-76, Cl. D15-30.000.

Mayer, Donald K.: *See—*
Forsty, William A.; and Mayer, Donald K., 242,798.

McAvin, Robert. Hood ornament. 242,786, 12-21-76, Cl. D12-199.000.

McCaughin, William M., to Chrysler Corporation. Cabinet for an electronic ignition analyzer. 242,777, 12-21-76, Cl. D10-78.000.

McTear, James Robert. Baseball glove. 242,747, 12-21-76, Cl. D2-361.000.

Micon Industries: *See—*
Cannon, Michael A., 242,821.
Cannon, Michael A., 242,822.

Micon Industries, a California Corporation: *See—*
Cannon, Michael A., 242,823.
Cannon, Michael A., 242,824.

Miller, Jerry H.: *See—*
Licari, Anthony; Miller, Jerry H.; and Kresge, Richard E., 242,773.

Misercola, Douglas, to Empire Brushes, Inc. Vented hair brush block or similar article. 242,750, 12-21-76, Cl. D4-31.000.

Mitchell, Bernard A. Bottle. 242,770, 12-21-76, Cl. D9-168.000.

Moberg, Robert S., to Graphic Marking Systems, Inc. Telephone accessory. 242,808, 12-21-76, Cl. D26-14.00A.

Morris, June M., to American Excelsior Company. Evaporative cooler pump. 242,825, 12-21-76, Cl. D15-7.000.

Neece, Roy M. Bracket for mounting a radio or the like in a vehicle. 242,766, 12-21-76, Cl. D8-233.000.

Newman, James F., to Uniroyal, Inc. Pneumatic tire tread and buttress. 242,784, 12-21-76, Cl. D12-143.000.

Noyes, Eliot F.: *See—*
Hunt, Ronald E.; Jenkins, William M.; and Noyes, Eliot F., 242,807.

Painter, David L.; and Duquaine, Edward J., Jr., to Dart Industries Inc. Rotisserie motor housing. 242,759, 12-21-76, Cl. D7-129.000.

Palmer, Robert D. Shelf or similar article. 242,752, 12-21-76, Cl. D6-132.000.

Papillon, Gilles. Combined compartmented container and cover for food or the like. 242,771, 12-21-76, Cl. D9-185.000.

Parrella, Frank J. Table lamp. 242,820, 12-21-76, Cl. D48-20.00R.

Patrick, Frank D., to Dow Chemical Company, The. Spacer for tower transmission lines. 242,765, 12-21-76, Cl. D8-230.000.

Plesset, Michael, to Concept Galleries, Inc. Mirror plaque. 242,812, 12-21-76, Cl. D11-133.000.

Posh, Rosa L.; and Jimenez, Fernando L. Foot massager or similar article. 242,826, 12-21-76, Cl. D83-1.00S.

Prodev Limited: *See—*
Wolfe, Maynard Frank, 242,762.

Richman, Leon H.; and Clayton, James Michael, to Baskin-Robbins Ice Cream Co. Roofless canopy for use above a retail sales counter, or similar article. 242,755, 12-21-76, Cl. D6-191.000.

Ross, Cecil J., to W. R. Weaver Company. Gun sight. 242,796, 12-21-76, Cl. D22-8.000.

Rowenta-Werke, GmbH: *See—*
Stuetzer, Franz Alban; and Figur, Bernd, 242,811.

Rynearson, Frederick L., to Rynearson, Incorporated. Combined molded earpiece and support for lightweight headsets. 242,810, 12-21-76, Cl. D26-14.00H.

Rynearson, Incorporated: *See—*
Rynearson, Frederick L., 242,810.

Saccoccio, Nazareno J., to Aro-Sac Inc. Ear clip. 242,817, 12-21-76, Cl. D11-88.000.

Schmidt, Dietrich F., to Capitol Products Corporation. Plastic thermal barrier frames and the like. 242,799, 12-21-76, Cl. D25-75.000.

Schmidt, Dietrich F., to Capitol Products Corporation. Plastic thermal barrier for use in constructing thermally insulated windows doors, and/or frames and the like. 242,800, 12-21-76, Cl. D25-76.000.

Schuss, Phillip, to Certain-teed Corporation. Ceiling tile. 242,801, 12-21-76, Cl. D25-80.000.

Schuss, Phillip, to Certain-teed Corporation. Ceiling tile. 242,802, 12-21-76, Cl. D25-80.000.

Schuss, Phillip, to Certain-teed Corporation. Ceiling tile. 242,803, 12-21-76, Cl. D25-80.000.

Schuss, Phillip, to Certain-teed Corporation. Ceiling tile. 242,804, 12-21-76, Cl. D25-80.000.

Sonitrix, Inc.: *See—*
Goble, Ralph W.; and Hackett, Kenneth R., 242,778.

Sontrix, Inc.: *See—*
Goble, Ralph W.; and Hackett, Kenneth R., 242,779.

Stark, Archie H. Foldable painter's easel. 242,757, 12-21-76, Cl. D6-176.000.

Stephenson, Reginald M.: *See—*
Graham, Joseph A.; Stephenson, Reginald M.; and Dewar, Donald D., 242,748.

Still Water Properties, N.V.: *See—*
Tyler, Nelson, 242,782.

Stone, Paul A. Corner loudspeaker enclosure. 242,806, 12-21-76, Cl. D26-14.00G.

Strang, Robert E., to Injection Plastic Co., Inc., The. Seat pedestal. 242,758, 12-21-76, Cl. D6-194.000.

Stuetzer, Franz Alban; and Figur, Bernd, to Rowenta-Werke, GmbH. Lighter. 242,811, 12-21-76, Cl. D27-36.000.

Takahashi, Kiichi: *See—*
Fukuda, Yoshinori; and Takahashi, Kiichi, 242,809.

Thermo King Corporation: *See—*
Forsty, William A.; and Mayer, Donald K., 242,798.

Thiokol Corporation: *See—*
Licari, Anthony; Miller, Jerry H.; and Kresge, Richard E., 242,773.

Tomy Kogyo Co., Inc.: *See—*
Kaga, Takashi, 242,815.

Tyler, Nelson, to Still Water Properties, N.V. Water sports vehicle. 242,782, 12-21-76, Cl. D12-69.000.

Uniroyal, Inc.: *See—*
Blankenship, Arthur C., 242,785.
Newman, James F., 242,784.

Universal Cooperatives, Inc.: *See—*
Johnson, Kendall R., 242,797.

Victor Comptometer Corporation: *See—*
Davis, Jack E., 242,795.

W. R. Weaver Company: *See—*
Ross, Cecil J., 242,796.

Walker Manufacturing Company: *See—*
Walker, Wesley Max, 242,813.

Walker, Wesley Max, to Walker Manufacturing Company. Livestock feed bunk. 242,813, 12-21-76, Cl. D30-13.000.

Wells, Stanley, to Mar-Line Displays Inc. Newspaper display stand. 242,751, 12-21-76, Cl. D6-24.000.

Williams, Albert J., Jr. Combined pencil and distance estimating device for golfers. 242,775, 12-21-76, Cl. D10-70.000.

Wolfe, Maynard Frank, to Prodev Limited. Stapler. 242,762, 12-21-76, Cl. D8-50.000.

Wood, Dwight F. Cross. 242,818, 12-21-76, Cl. D31-21.300.

Xerox Corporation: *See—*
Cathey, Wayne Carl, 242,805.
Kane, Michael J., 242,787.
Kane, Michael J., 242,793.

Yamaguchi, Koichi. Link for a decorative chain. 242,767, 12-21-76, Cl. D8-261.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 21, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

53 3,997,920
75 3,997,921
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1.5 3,997,923

CLASS 4

172 3,997,924
172.17 3,997,925

CLASS 5

62 3,997,926
344 3,997,927

CLASS 8

19 3,998,585
21 B 3,998,586
149.1 3,997,928
155.1 3,997,929
169 3,998,587
176 3,998,588

CLASS 9

9 3,997,930

CLASS 12

38 3,997,931

CLASS 13

9 R 3,999,000
10 3,999,001

CLASS 14

71.3 3,997,932

CLASS 15

102 3,997,933
246 3,997,934
250.36 3,997,935
301 3,997,936

CLASS 16

6 3,997,937
45 3,997,938
171 3,997,939

CLASS 17

1 A 3,997,940
35 3,997,941

CLASS 19

155 3,997,942

CLASS 21

58 3,998,589
89 3,998,590

CLASS 23

353 R 3,998,591
254 E 3,998,592
258.5 MH 3,998,593
259 3,998,594
262 3,998,595
3,998,596
266 3,998,597
273 SP 3,998,598
288 FC 3,998,599

CLASS 24

30.5 P 3,997,943
86 C 3,997,944
129 R 3,997,945

CLASS 26

2 E 3,997,947
2 R 3,997,946

CLASS 27

2 3,997,948
3,997,949

CLASS 28

72.16 3,997,950

CLASS 29

96 3,997,951
115 3,997,952
116 AD 3,997,953
149.5 B 3,997,954
180 SS 3,998,600
195 3,998,601
3,998,602
197 3,998,603
203 HT 3,997,955
203 MW 3,997,956
239 3,997,957
3,997,958
244 3,997,959
256 3,997,961
263 3,997,960
427 3,997,962
578 3,997,963
583 3,997,964
596 3,997,965

CLASS 30

28 3,997,966
34.1 3,997,967
43.92 3,997,968
3,997,969

CLASS 32

14 B 3,997,971
14 R 3,997,970

CLASS 33

18 R 3,997,972
265 3,997,974
324 3,997,975
391 3,997,976

CLASS 34

73 3,997,977
104 3,997,978

CLASS 35

29 R 3,997,979
46 R 3,997,980
48 R 3,997,981
56 3,997,982

CLASS 36

72 R 3,997,983
91 3,997,984
97 3,997,985

CLASS 37

8 3,997,986
103 3,997,987
141 R 3,997,988
142 A 3,997,989
189 3,997,990

CLASS 40

135 3,997,991
159 3,997,992
218 3,997,993

CLASS 42

9 3,997,994
77 3,997,995

CLASS 43

4 3,997,996
24 3,997,997
53.5 3,997,998
107 3,997,999
112 3,998,000

CLASS 44

1 R 3,998,604
62 3,998,605

CLASS 46

8 3,998,001
17 3,998,002
25 3,998,003
30 3,998,004
41 3,998,005

CLASS 47

9 3,998,006
39 3,998,007

CLASS 48

71 3,998,606
197 R 3,998,607
3,998,608
3,998,609

CLASS 49

47 3,998,008
394 3,998,009

CLASS 51

105 SP 3,998,010
338 3,998,011
391 3,998,012

CLASS 52

69 3,998,013
100 3,998,014
222 3,998,015
232 3,998,016
233 3,998,017
478 3,998,019
481 3,998,018
484 3,998,020
531 3,998,021
574 3,998,022
595 3,998,023
3,998,024
632 3,998,025
714 3,998,026
716 3,998,027
727 3,998,028
747 3,998,029

CLASS 53

37 3,998,030
124 R 3,998,031
352 3,998,032

CLASS 54

6 R 3,998,033

CLASS 55

17 3,998,610
118 3,998,611
220 3,998,612
256 3,998,613
417 3,998,614

CLASS 56

11.3 3,998,034
13.5 3,998,035
3,998,036
295 3,998,037
336 3,998,038

CLASS 57

58.95 3,998,039
3,998,040
77.4 3,998,041
140 BY 3,998,042

CLASS 58

23 R 3,998,043
3,998,044
3,998,045
3,998,046

CLASS 60

39.03 3,998,047
39.09 P 3,998,048
39.55 3,998,049
245 3,998,050
258 3,998,051
413 3,998,052
422 3,998,053
517 3,998,054
599 3,998,055
641 3,998,056
644 3,998,057
652 3,998,058
659 3,998,059

CLASS 61

1 F 3,998,060
50 3,998,062
53 3,998,063
53.5 3,998,064
72.6 3,998,065
85 3,998,066
3,998,067
88 3,998,061

CLASS 62

186 3,998,068
288 3,998,069
393 3,998,070
430 3,998,071
457 3,998,072

CLASS 65

29 3,998,615
3,998,616
33 3,998,617
105 3,998,618
136 3,998,619

CLASS 66

50 R 3,998,073
149 R 3,998,075
172 E 3,998,076
214 3,998,074

CLASS 70

74 3,998,077
171 3,998,078
292 3,998,079
338 3,998,080

CLASS 71

85 3,998,620
93 3,998,621

CLASS 72

56 3,998,081
77 3,998,082
81 3,998,083
201 3,998,084
316 3,998,085
325 3,998,086
349 3,998,087

CLASS 73

1 E 3,998,088
3 3,998,089
12 3,998,090
32 3,998,091
71.3 3,998,092
112 3,998,093
114 3,998,094
117 3,998,095
151 3,998,096
211 3,998,097
356 3,998,098
374 3,998,099
379 3,998,100
421.5 R 3,998,101
3,998,102
425.6 3,998,103
503 3,998,104
505 3,998,105
516 R 3,998,106

CLASS 74

18.2 3,998,466
84 S 3,998,107
89.15 3,998,108
475 3,998,109
476 3,998,110
752 C 3,998,111
805 3,998,112

CLASS 75

.5 AB 3,998,622
10 R 3,998,623
30 3,998,624
53 3,998,625
60 3,998,626
101 BE 3,998,627
104 3,998,628
109 3,998,629
130 R 3,998,630
132 3,998,631
134.V 3,998,632
162 3,998,633

CLASS 82

1 C 3,998,113
34 D 3,998,114

CLASS 83

56 3,998,115
98 3,998,116
199 3,998,117
205 3,998,118
328 3,998,119
335 3,998,120
471.3 3,998,121

CLASS 84

125 3,998,122
422 S 3,998,123

CLASS 89

1.5 D 3,998,124
33 CA 3,998,125
184 3,998,126

CLASS 90

14 3,998,127

CLASS 91

29 3,998,128
39 3,998,129
59 3,998,130
372 3,998,131
395 3,998,132
412 3,998,134
488 3,998,133

CLASS 93

35 R 3,998,135
37 R 3,998,136
58.3 3,998,139
61 R 3,998,137
3,998,138
84 R 3,998,140
93 M 3,998,141

CLASS 96

1 PS 3,998,635
1 R 3,998,634
1.4 3,998,636
3 3,998,637
36.1 3,998,638
36.2 3,998,639
54 3,998,640
100 3,998,641
3,998,642

CLASS 98

36 3,998,142

CLASS 99

280 3,998,143
293 3,998,144
339 3,998,145
403 3,998,146

CLASS 100

11 3,998,147
117 3,998,148
118 3,998,149
269 R 3,998,150

CLASS 101

6 3,998,151
93.29 3,998,152
93.48 3,998,153
3,998,154
110 3,998,155
115 3,998,156
120 3,998,157
3,998,158
131 3,998,159
426 3,998,160

CLASS 102

43 R 3,998,161
56 SC 3,998,162
70.2 GA 3,998,163
81.2 3,998,164

CLASS 104

12 3,998,165
243 3,998,166

CLASS 105

477 3,998,167
490 3,998,168

CLASS 106

2 3,998,643
15 R 3,998,644
30 3,998,645
44 3,998,646
54 3,998,647
67 3,998,648
100 3,998,649
118 3,998,650
306 3,998,651
308 N 3,998,652

CLASS 108

53.5 3,998,169
91 3,998,170

CLASS 111

2 3,998,171

CLASS 112

252 3,998,172
262 3,998,173

CLASS 113

120 H 3,998,174

CLASS 114

39 3,998,175
283 3,998,176

CLASS 115

18 E 3,998,177

CLASS 116

28 R 3,998,178
129 D 3,998,179

CLASS 118

5 3,998,180
8 3,998,181
3,998,182
420 3,998,183
651 3,998,185
658 3,998,184

CLASS 119

2 3,998,186
29 3,998,187

CLASS 122

250 R 3,998,188

CLASS 123

32 EA 3,998,189
90.5 3,998,190
102 3,998,191
117 A 3,998,192
117 R 3,998,193
119 A 3,998,194
141 3,998,195
146.5 A 3,998,196
148 CC 3,998,197
3,998,198
188 GC 3,998,199
197 R 3,998,200

CLASS 124

35 A 3,998,202

CLASS 125

23 C 3,998,201

CLASS 126

122 3,998,203
270 3,998,204
271 3,998,205
3,998,206
3,998,207
377 3,998,208

CLASS 128

1 R 3,998,209
2 E 3,998,212
2 F 3,998,211
2 H 3,998,210
2.06 A 3,998,214
2.06 E 3,998,215
2.1 B 3,998,213
6 3,998,216
20 3,998,217
70 3,998,218
89 R 3,998,219
91 R 3,998,220
132 D 3,998,221
214 R 3,998,222
218 P 3,998,223
218 R 3,998,224
263 3,998,225
266 3,998,226
276 3,998,227
295 3,998,228
305 3,998,229
330 3,998,230
476 3,998,231

CLASS 131

262 B 3,998,232

CLASS 132

48 A 3,998,233
84 R 3,998,234
88.5 3,998,235
92 R 3,998,236

CLASS 133

3 A 3,998,237
5 A 3,998,238

CLASS 134

1 3,998,653
4 3,998,654
12 3,998,655
33 3,998,656

CLASS 136

89 R 3,998,659

CLASS 137

101.11 3,998,239
375 3,998,240
454.6 3,998,241
608 3,998,242
856 3,998,243

CLASS 138

43 3,998,244
89 3,998,245

CLASS 139

1 R 3,998,246
54 3,998,247
291 C 3,998,249
336 3,998,250
448 3,998,251
449 3,998,248

CLASS 144

3 R 3,998,252
28.1 3,998,253
35 R 3,998,254

CLASS 148

1.5 3,998,661
3,998,662
2 3,998,663
3 3,998,664
6.2 3,998,670
11.5 R 3,998,665

16.6 3,998,666
22 3,998,667
3,998,668
31.57 3,998,669
126 3,998,671
171 3,998,672
175 3,998,673
3,998,674
189 3,998,675

CLASS 149

7 3,998,676

CLASS 150

1 3,998,255

CLASS 152

209 R 3,998,256
210 3,998,257
405 3,998,258

CLASS 156

3 3,998,677
3,998,678
42 3,998,679
109 3,998,680
154 3,998,681
158 3,998,682
164 3,998,683
253 3,998,684
260 3,998,685
617 R 3,998,686
619 3,998,687

CLASS 162

50 3,998,688
136 3,998,689
141 3,998,690

CLASS 163

5 3,998,259

CLASS 164

21 3,998,260
66 3,998,261
131 3,998,262
181 3,998,263
251 3,998,264
342 3,998,265

CLASS 165

8 3,998,266
48 3,998,267
162 3,998,268

CLASS 166

250 3,998,269
275 3,998,270
280 3,998,271
281 3,998,272

CLASS 169

37 3,998,273
89 3,998,274

CLASS 172

26 3,998,275
67 3,998,276
804 3,998,277

CLASS 173

13 3,998,278
105 3,998,279

CLASS 174

15 BH 3,999,002
23 R 3,999,003
68.5 3,999,004

CLASS 175

5 3,998,280
16 3,998,281
335 3,998,282
3,998,283

CLASS 176

16 3,998,691
3,998,692
20 R 3,998,693
22 3,998,694
39 3,998,695

CLASS 177

147 3,998,284

CLASS 178

18 3,999,012
58 A 3,999,013

CLASS 179

1 AT 3,999,014
1 H 3,999,015
6 D 3,999,017
6 E 3,999,016
18 FA 3,999,018
27 FF 3,999,019
180 3,999,020

CLASS 180

1 AP 3,998,285
6.64 3,998,289
9.48 3,998,286
25 R 3,998,287
26 R 3,998,288
70 P 3,998,290
91 3,998,291

CLASS 182

128 3,998,292
204 3,998,293
229 3,998,294

CLASS 188

71.7 3,998,295
73.5 3,998,296
79.5 GT 3,998,297
181 R 3,998,298
223.1 3,998,299
250 A 3,998,300
251 A 3,998,301
285 3,998,302
340 3,998,303

CLASS 190

48 3,998,304

CLASS 191

5 3,998,305
23 R 3,998,306

CLASS 194

4 R 3,998,307
10 3,998,308
97 R 3,998,309

CLASS 195

31 R 3,998,696
47 3,998,697
51 S 3,998,701
80 R 3,998,698
3,998,699
96 3,998,700

CLASS 196

14.52 3,998,702

CLASS 197

1 A 3,998,310
1 R 3,998,315
19 3,998,311
55 3,998,312
133 P 3,998,313
181 3,998,314

CLASS 198

341 3,998,317
344 3,998,316
347 3,998,319
463 3,998,320
495 3,998,321
497 3,998,322
657 3,998,318
835 3,998,323

CLASS 200

11 DA 3,999,021
23 3,999,022
46 3,999,023
68 3,999,024
159 B 3,999,025

CLASS 201

32 3,998,703

CLASS 202

160 3,998,704
251 3,998,705

CLASS 203

7 3,998,706

CLASS 204

50 R 3,998,707
59 R 3,998,708
98 3,998,709
130 3,998,710
157.1 S 3,998,711
159.15 3,998,712
159.16 3,998,715
159.24 3,998,713
181 3,998,716
195 P 3,998,717
298 3,998,718
299 3,998,719
300 EC 3,998,720

CLASS 206

387 3,998,324
400 3,998,325
407 3,998,326
508 3,998,327
511 3,998,328

CLASS 208

111 3,998,721
112 3,998,722
139 3,998,723
3,998,724
253 3,998,725
309 3,998,726

CLASS 209

74 M 3,998,329
91 3,998,330
111.5 3,998,331
127 R 3,998,727
172.5 3,998,728
240 3,998,729

CLASS 210

28 3,998,730
32 3,998,731
3,998,732
59 3,998,733
62 3,998,714
65 3,998,734
77 3,998,735
104 3,998,736
172 3,998,737
180 3,998,738
189 3,998,739
195 S 3,998,740
222 3,998,741

CLASS 211

13 3,998,332
41 3,998,333
45 3,998,334
49 D 3,998,335

CLASS 212

48 3,998,336

CLASS 213

153 3,998,337

CLASS 214

1 BC 3,998,338
6 D 3,998,339
38 C 3,998,340
90 R 3,998,341
142 3,998,342
518 3,998,343
520 3,998,344
701 P 3,998,345
730 3,998,346

CLASS 215

1 R 3,998,347
11 E 3,998,348
231 3,998,349

CLASS 219

10.55 A 3,999,026
10.55 B 3,999,027
69 M 3,999,028
107 3,999,029
121 EB 3,999,032
121 EM 3,999,030
3,999,031
130 3,999,033
131 R 3,999,034
137 R 3,999,035
145 3,999,036
211 3,999,037
275 3,999,039
543 3,999,040

CLASS 220

1 B 3,998,350
23.83 3,998,351
90 3,998,352
210 3,998,353
269 3,998,354
304 3,998,355

CLASS 221

2 3,998,356
21 3,998,357
91 3,998,358

CLASS 222

3 3,998,359
181 3,998,360
182 3,998,361
185 3,998,362
321 3,998,363
511 3,998,364
590 3,998,365

CLASS 223

68 3,998,366

CLASS 224

1 A 3,998,367

CLASS 226

42 3,998,368
58 3,998,369
150 3,998,370

CLASS 227

9 3,998,372

CLASS 228

2 3,998,373
107 3,998,374
122 3,998,375
154 3,998,376
180 A 3,998,377

CLASS 229

3.1 3,998,378
17 R 3,998,380
33 3,998,379

CLASS 233

3 3,998,381
7 3,998,382
26 3,998,383

CLASS 235

61 G 3,999,041
61.11 E 3,999,043
61.7 R 3,999,042
151 3,999,044
151.1 3,999,045
3,999,046
151.12 3,999,048
151.3 3,999,047
152 3,999,049
3,999,050
153 A 3,999,053
153 AK 3,999,051
153 AM 3,999,052

CLASS 236

87 3,998,384

CLASS 237

12.3 B 3,998,385

CLASS 239

102 3,998,386
3,998,387
187 3,998,388
214.21 3,998,389
224 Re.29,083
394 3,998,390
542 3,998,391
547 3,998,392
553.5 3,998,393
562 3,998,394

CLASS 240

1.2 3,999,054
1.3 3,999,055
41 R 3,999,056
51.11 R 3,999,057
62 R 3,999,058

CLASS 241

46.11 3,998,395
81 3,998,396

CLASS 242

35.5 A 3,998,397
55.16 3,998,398
65 3,998,399
68.3 3,998,400
74.1 3,998,401
106 3,998,402
129.72 3,998,403
158.3 3,998,404

CLASS 243

19 3,998,405

CLASS 244

3.14 3,998,406
3.28 3,998,407
138 R 3,998,408
165 3,998,409
183 3,998,410
188 3,998,411
189 3,998,412

CLASS 246

172 3,998,413

CLASS 248

2 3,998,414
101 3,998,415
210 3,998,416
222.2 3,998,417
309 R 3,998,418
323 3,998,419
429 3,998,420
441 B 3,998,421
510 3,999,059

CLASS 249

117 3,998,422
120 3,998,423
190 3,998,424

CLASS 250

214 R 3,999,060
3,999,061
227 3,999,062
231 R 3,999,063
231 SE 3,999,064
281 3,999,065
304 3,999,066
312 3,999,067
328 3,999,068
338 3,999,069
362 3,999,070
370 3,999,071
427 3,999,072
445 T 3,999,073
551 3,999,074

CLASS 251

129 3,998,425
147 3,998,426
208 3,998,427

CLASS 252

8.5 A 3,998,742
8.55 B 3,998,743
8.55 R 3,998,744
41 3,998,745
62.1 L 3,998,746
62.1 R 3,998,747
62.9 3,998,748
70 3,998,749
108 3,998,750
187 H 3,998,751
300 3,998,752
312 3,998,753
351 3,998,754
415 3,998,755
422 3,998,756
465 3,998,757
466 J 3,998,758
466 PT 3,998,759
471 3,998,760
544 3,998,761
551 3,998,762

CLASS 254

29 R 3,998,428
79 3,998,429
149 3,998,430
150 R 3,998,431
168 3,998,432

CLASS 259

8 3,998,433
73 3,998,434
114 3,998,435
154 3,998,436
3,998,437
191 3,998,438
192 3,998,439

CLASS 260

2 EC 3,998,763
2.5 AJ 3,998,764
2.5 AQ 3,998,766
2.5 D 3,998,767
2.5 F 3,998,765
17 R 3,998,768
17.4 SG 3,998,770
17.4 ST 3,998,769
18 PN 3,998,771
20.6 SQ 3,998,776
23.7 A 3,998,772
29.2 EP 3,998,773
29.6 E 3,998,777
29.6 MN 3,998,775
29.6 T 3,998,774
33.6 AQ 3,998,778
37 EP 3,998,779
37 NP 3,998,780
42.45 3,998,781
45.75 A 3,998,783
45.75 N 3,998,784
45.75 W 3,998,785
45.8 R 3,998,782
47 CP 3,998,786
47 CZ 3,998,787
47 P 3,998,789
67 R 3,998,791
73 L 3,998,792
75 R 3,998,793
77.5 AM 3,998,794
78 A 3,998,795
79.7 3,998,796
112 R 3,998,798
112.5 R 3,998,799
123.5 3,998,800
155 3,998,801
156 3,998,802
3,998,803
206 3,998,804
207 3,998,805
239 B 3,998,808
239 BD 3,998,809
239 D 3,998,810
239.3 D 3,998,811
239.5 3,998,829
239.55 C 3,998,813
239.9 3,998,812
240 K 3,998,815
240 R 3,998,814
243 A 3,998,820
243 C 3,998,816
3,998,817
3,998,818
3,998,819
3,998,821
246 B 3,998,822
247.2 A 3,998,823
249.5 3,998,825
3,998,826
256.4 C 3,998,827
256.5 R 3,998,828
260 3,998,830
289 H 3,998,831
293.5 S 3,998,833
293.54 3,998,832
293.68 3,998,834
294.8 C 3,998,835
294.9 3,998,836
309.5 3,998,837
309.6 3,998,838
314.5 3,998,839
326 N 3,998,840
326 S 3,998,841
326.41 3,998,843
326.47 3,998,844
326.5 B 3,998,842
332.1 3,998,845
335 3,998,846
340.5 3,998,847
340.6 3,998,848
340.9 3,998,849
3,998,850
343.2 R 3,998,851
345.8 3,998,852
346.2 M 3,998,853
346.8 M 3,998,854
348 R 3,998,855
3,998,856
369 3,998,857
396 R 3,998,858
397.1 3,998,859
397.2 3,998,860
404 3,998,861
404.5 3,998,862
410.5 3,998,863
439 R 3,998,864
448.2 S 3,998,865
453 A 3,998,866
465.3 3,998,867
468 D 3,998,869
468 H 3,998,868
470 3,998,870
3,998,871
483 3,998,872
486 R 3,998,873
501.17 3,998,874
515 A 3,998,875
530 N 3,998,876
3,998,877
536 3,998,878
556 AC 3,998,879
559 B 3,998,880
563 R 3,998,881
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566 D 3,998,883
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607 R 3,998,888
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CLASS 299

4 3,998,492
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308 3,999,088

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3 R 3,998,497
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205 3,998,506
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49 R 3,999,090
52 3,999,091
156 3,999,092
198 3,999,093

CLASS 312

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263 3,998,509

CLASS 313

192 3,999,094
318 3,999,095
330 3,999,096
361 3,999,097
407 3,999,098

CLASS 315

93 3,999,099
308 3,999,100
408 3,999,101
410 3,999,102

CLASS 316

17 3,998,510

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18 D 3,999,103
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100 3,999,105
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CLASS 336

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CLASS 352

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23 D 3,999,191
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3 R 3,998,536
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92 3,999,219
125 3,999,216

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53 3,998,945
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330 3,998,971
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400 3,998,988
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447 3,998,991
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461 3,998,993

CLASS 429

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196 3,998,657
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CLASS 431

158 3,998,581
349 3,998,582

CLASS 432

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CLASS 526

15 3,998,994
59 3,998,995
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271 3,998,997
295 3,998,998

CLASS 528

487 3,998,797

CLASS 536

1 3,998,999
23 3,998,807
24 3,998,806

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D2—	272	242,746		149	242,760	D10—	38	242,774		199	242,786		142	242,798
	361	242,747	D8—	10	242,761		70	242,775	D15—	7	242,825	D25—	75	242,799
D3—	19 A	242,749		50	242,762		75	242,776		30	242,816		76	242,800
D4—	06	242,748		109	242,763		78	242,777	D16—	65	242,788		80	242,801
	31	242,750		154	242,764		106	242,778			242,789			242,802
D6—	24	242,751		230	242,765			242,779		83	242,790			242,803
	132	242,752		233	242,766		114	242,780			242,791			242,804
	176	242,757		261	242,767		121	242,781	D19—	49	242,792	D26—	5 C	242,805
	183	242,753	D9—	67	242,768	D11—	88	242,817		62	242,787		14 A	242,808
	188	242,754			242,769		133	242,812			242,793		14 B	242,807
	191	242,755		168	242,770	D12—	69	242,782		89	242,794			242,809
	194	242,758		185	242,771		112	242,783	D22—	8	242,796		14 G	242,806
	256	242,756		194	242,772		143	242,784		27	242,795		14 H	242,810
D7—	129	242,759		258	242,773		147	242,785	D23—	22	242,797	D27—	36	242,811

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D31—	21.3	242,818												
D34—	4 R	242,814												
	15 R	242,815												
D48—	20 D	242,819												
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3,998,436
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56 : 3,999,022
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DESIGN PATENTS

1 : 242,828	242,822	17 : 242,759	26 : 242,783	242,767	242,798		
4 : 242,780	242,823	242,760	242,784	242,776	242,799		
6 : 242,752	242,824	242,770	242,785	242,790	242,800		
242,755	8 : 242,778	242,820	27 : 242,797	242,791	242,812		
242,756	242,779	18 : 242,758	29 : 242,753	242,826	44 : 242,817		
242,757	242,813	242,806	242,761	39 : 242,781	48 : 242,765		
242,782	9 : 242,747	242,816	32 : 242,749	242,801	242,766		
242,786	242,751	20 : 242,763	34 : 242,768	242,802	242,796		
242,794	242,789	25 : 242,787	242,769	242,803	242,805		
242,808	12 : 242,773	242,788	36 : 242,750	242,804	242,807		
242,810	242,777	242,793	242,754	40 : 242,819	242,825		
242,818	242,795	242,814	242,764	42 : 242,775	242,827		
242,821							

PLANT PATENTS

6 : 3,994	3,995	3,997	3,998	37 : 3,993	48 : 3,992

U. S. GOVERNMENT PRINTING OFFICE : O - 1976

U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner